Air Live®

www.airlive.com

WMM-3000PCM/PCI

MIMO-G Wireless LAN Adapter

User's Manual

Production component

This WIRELESS production should contain the following items:

1. One piece of CardBus or PCI adapter **MIMO WIRELESS LAN Card**
2. One piece of CD which contain drivers, user's manual, and utility

Quick Installation

1. Insert the product's CD into CD-ROM.
2. Exit all application programs and insert the 11B/G **MIMO WIRELESS LAN Card** into the PCMCIA slot on notebook or PCI slot on desktop.
3. Following "**Found New Hardware Wizard**" window to install driver step by step.
4. Install "Driver & Utility"
5. Configure your **MIMO WIRELESS LAN Card** with "Zero Configure" or " **AirLive MIMO Wireless Utility**" to connect to WIRELESS network.

FCC Information

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received; including interference that may cause undesired operation. Federal Communications Commission (FCC) Statement.

This Equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Contents

Chapter 1 System Requirements ____ *5*

1-1 Hardware ____ **5**

1-2 Software ____ **5**

Chapter 2 Install Driver for Windows Series ____ *6*

2-1 Set up MIMO WIRELESS LAN Card for Windows Series ____ **6**

Chapter 3 Configure MIMO WIRELESS LAN Card ____ *8*

3-1 Install Utility ____ **8**

3-2 Configure MIMO WIRELESS LAN Card with Zero Configure ____ **10**

Chapter 4 Configure with "AirLive MIMO Wireless Utility" for Windows 98/ME/2000/XP ____ *13*

4-1 Site Survey Page ____ **13**

4-1-1 Add/Edit Profile ____ 14

4-2 Authentication & Security ____ **16**

4-2-1 802.1x Setting ____ 17

4-2-2 CA Server ____ 18

4-3 Profile Page ____ **20**

4-4 Link Status Page ____ **21**

4-5 Statistics Page ____ **22**

4-6 About Page ____ **24**

Chapter 5 Example ____ *25*

5-1 Adding profile in site survey page ____ **25**

5-2 Add profile in profile page ____ **28**

5-3 WEP encryption ____ **32**

5-4 Configure connection with WPA-PSK ____ **35**

5-5 Configure connection with WPA2-PSK ____ **38**

5-6 Configure connection with WPA by 802.1x setting ____ **41**

5-7 Configure connection with WPA2 by 802.1x setting ____ **50**

Chapter 1 System Requirements

Before installing the adapter and related software, make sure the computer system meets the minimum requirements described below.

1-1 Hardware

The adapter can be installed in any recent-model IBM-type microcomputer with a PCMCIA on notebook or PCI slot on desktop which support CardBus or PCI interface. The CardBus adapter is a Type II CardBus card, and can be installed in a Type II or Type III CardBus slot.

1-2 Software

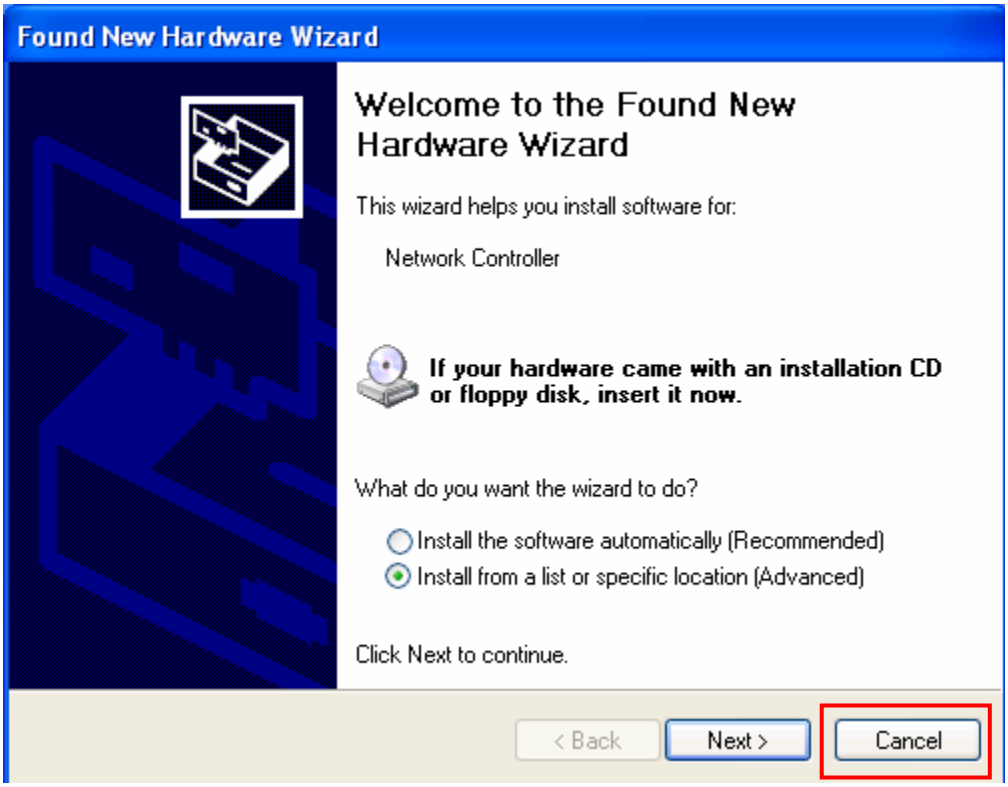
The drivers included with the adapter allow the adapter to be used in Microsoft Windows 98, ME, 2000, and XP.

Chapter 2 Install Driver for Windows Series

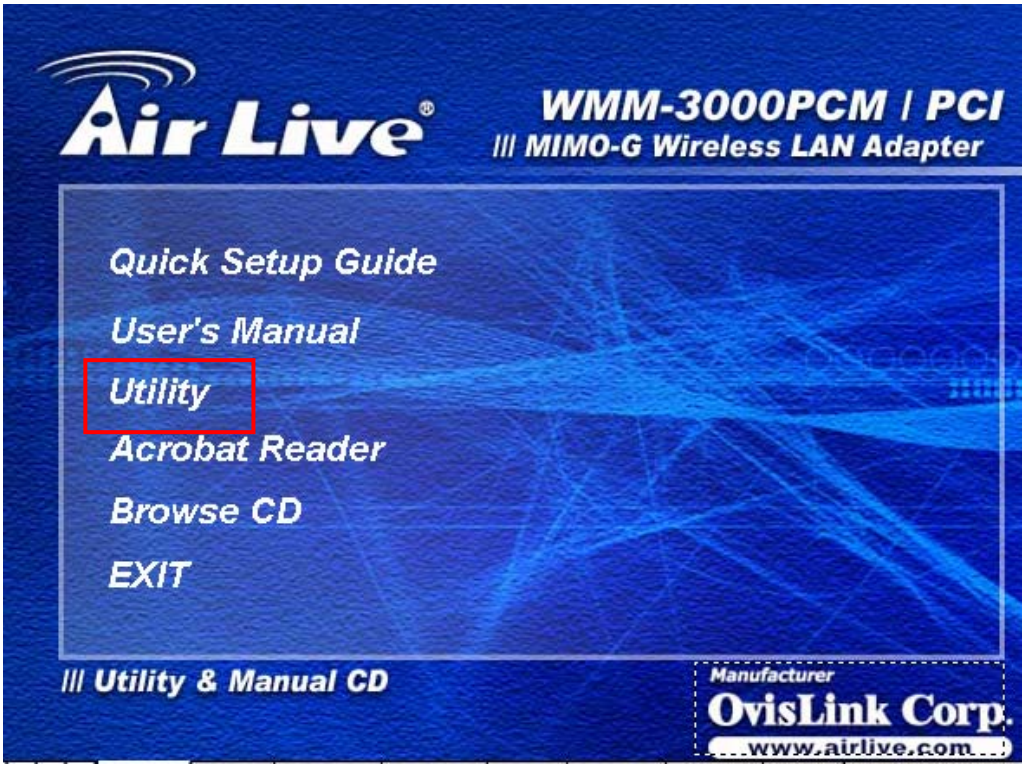
This section describes the installation of the 11B/G **MIMO WIRELESS LAN Card** driver for the Windows98/ME/2000 and Windows XP operating systems.

2-1 Set up MIMO WIRELESS LAN Card for Windows Series

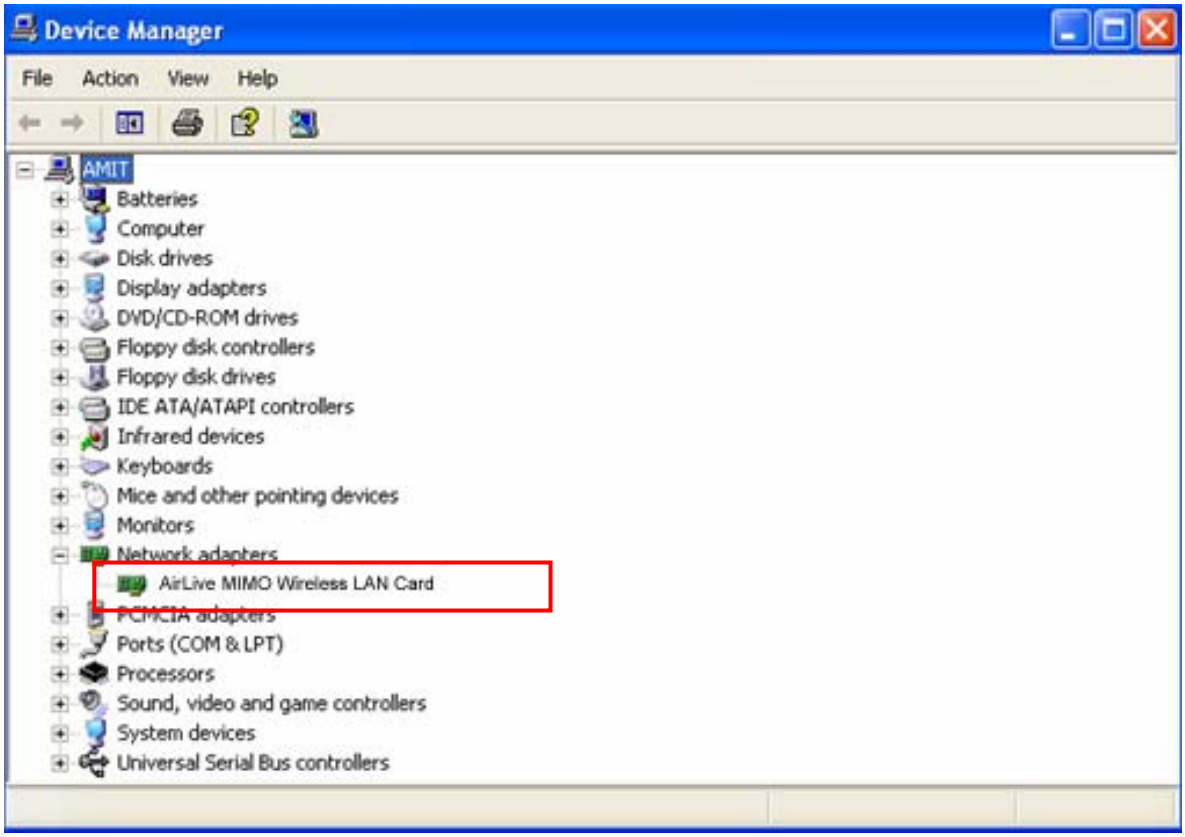
Step 1: After inserting the **MIMO WIRELESS LAN Card** into the PCMCIA slot on notebook or PCI slot desktop, the Windows will auto-detect the MOMO WIRELESS LAN Card and a "**Found New Hardware Wizard**" window will show up. Select "**Cancel**" to install the driver from CD-Rom.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
Network Controller
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

Step 2: Insert the Product CD-ROM into the CD-ROM drive. Select "**Utility**" to install Driver and Utility.



Step 3: After installing the driver, you can check if your device is active in the device management as follows

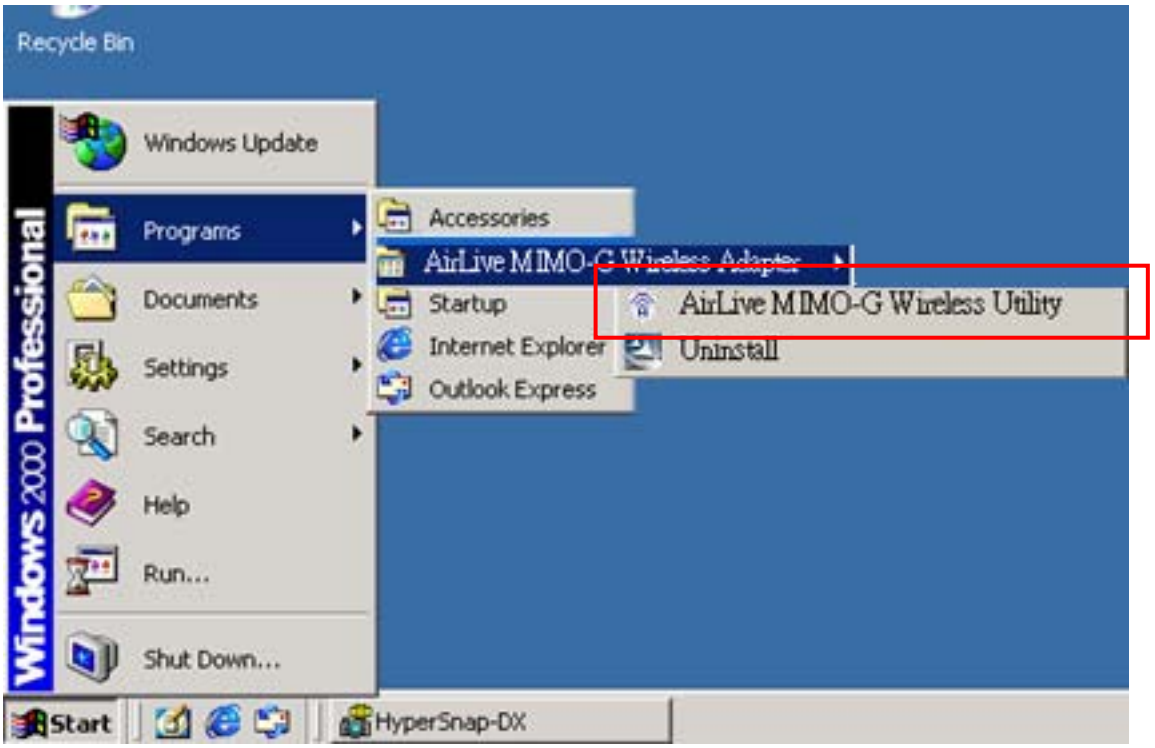


Chapter 3 Configure MIMO WIRELESS LAN Card

This chapter will show you how to configure your **MIMO WIRELESS LAN Card** by using utility in the Product CD Package under Windows series Operation System

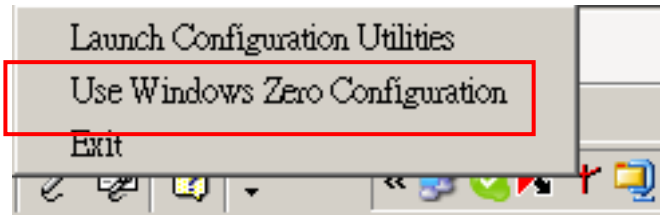
3-1 Install Utility

1. After finishing the install process, you can execute the utility as follows



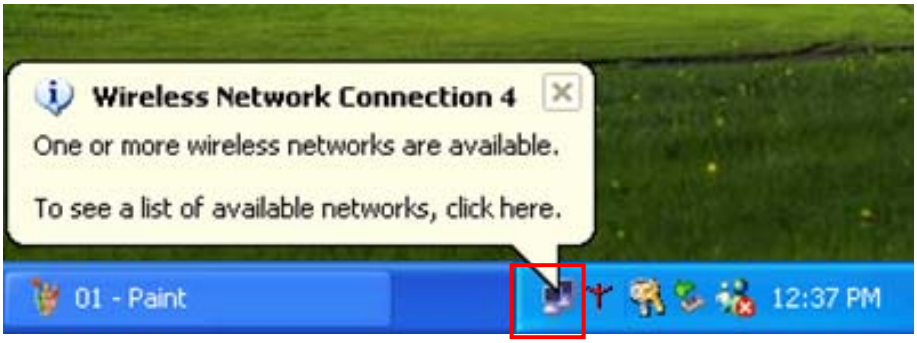
3. You will see the utility icon after you executing program “Wireless Utility” if your **MIMO WIRELESS Card** is alive

4. If your operation system belong to Windows XP and have update to SP1, click the right button on the icon. You will see the frame below. If you want to configure your **MIMO Wireless LAN Card** with "Wireless Zero Configure" supported by XP, you should choose "Use Zero Configuration as Configuration utility".

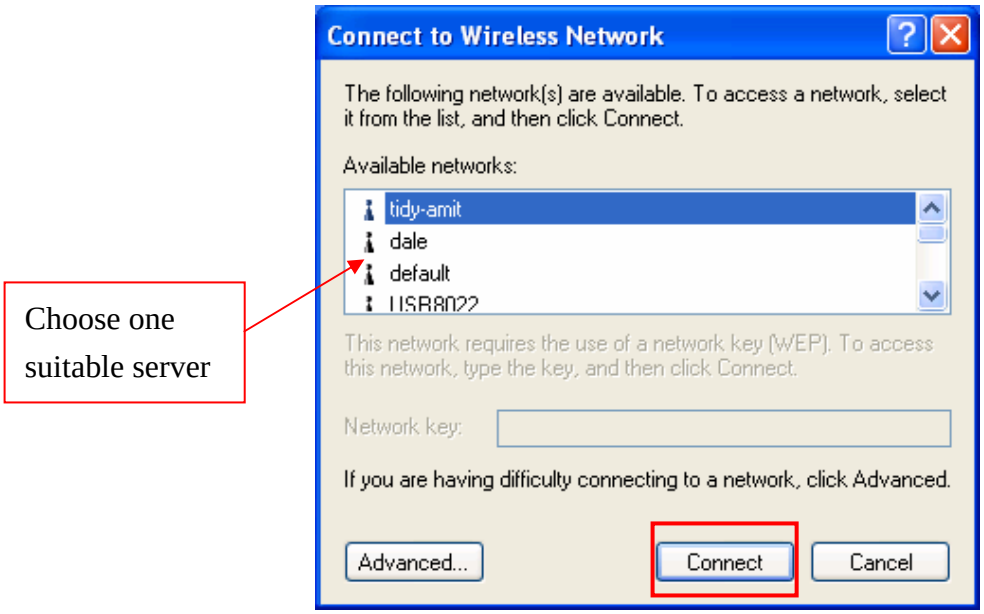


3-2 Configure MIMO WIRELESS LAN Card with Zero Configure

After installing **MIMO Wireless LAN Card**, the Windows XP will display a "WIRELESS Network Connection " message.

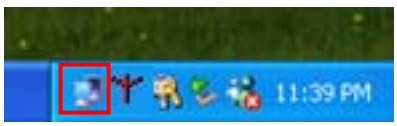

Wireless Network Connection 4
One or more wireless networks are available.
To see a list of available networks, click here.
01 - Paint
12:37 PM

Click on the message and the "*Automatic WIRELESS Network Configuration*" will then appear automatically and allow users to connect to an available WIRELESS infrastructure network (Access Point), shown as follows. You may click the Advanced button to make advanced configuration for the WIRELESS LAN Card, shown as below.

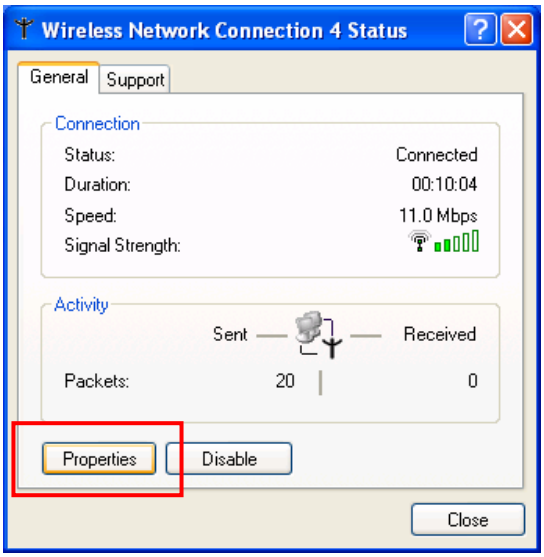

Choose one suitable server
Connect to Wireless Network
The following network(s) are available. To access a network, select it from the list, and then click Connect.
Available networks:
tidy-amit
dale
default
This network requires the use of a network key (WEP). To access this network, type the key, and then click Connect.
Network key:
If you are having difficulty connecting to a network, click Advanced.
Advanced...
Connect
Cancel

In order to reconfigure you WIRELESS connection, you can deal as follow procedure

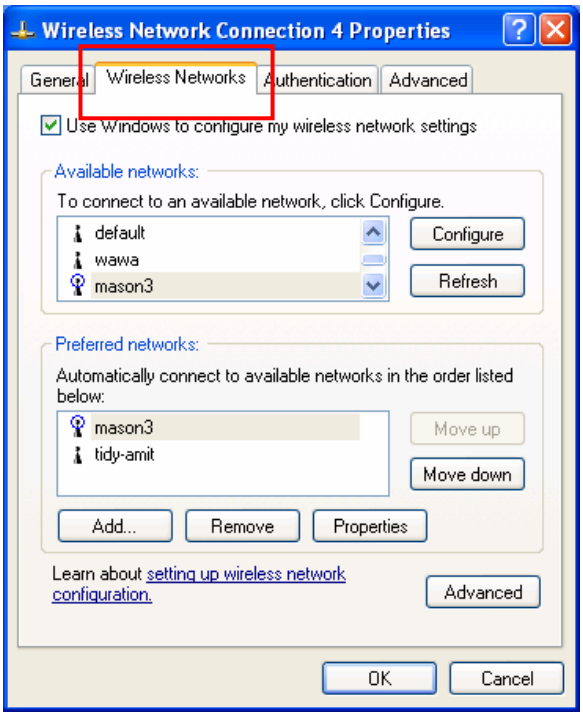
1.click left button on the network icon as bellow.



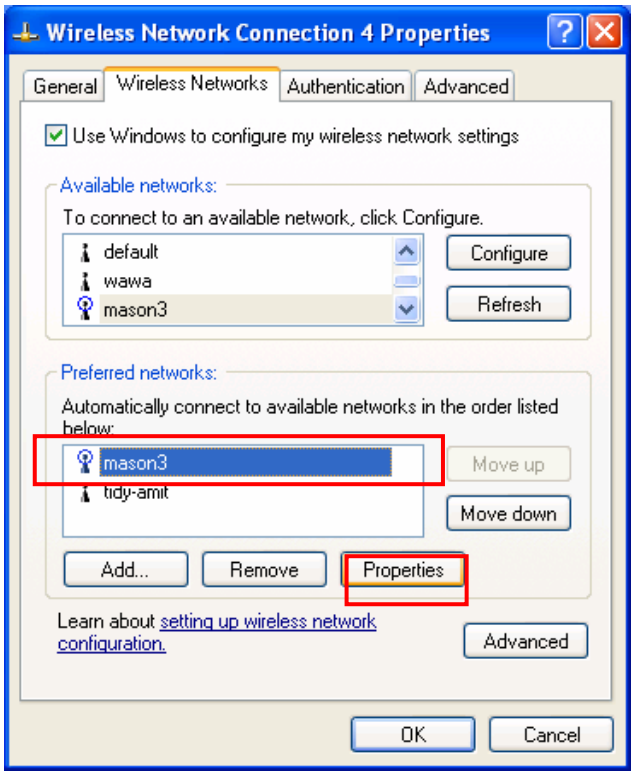
2. Click **Properties** to continue

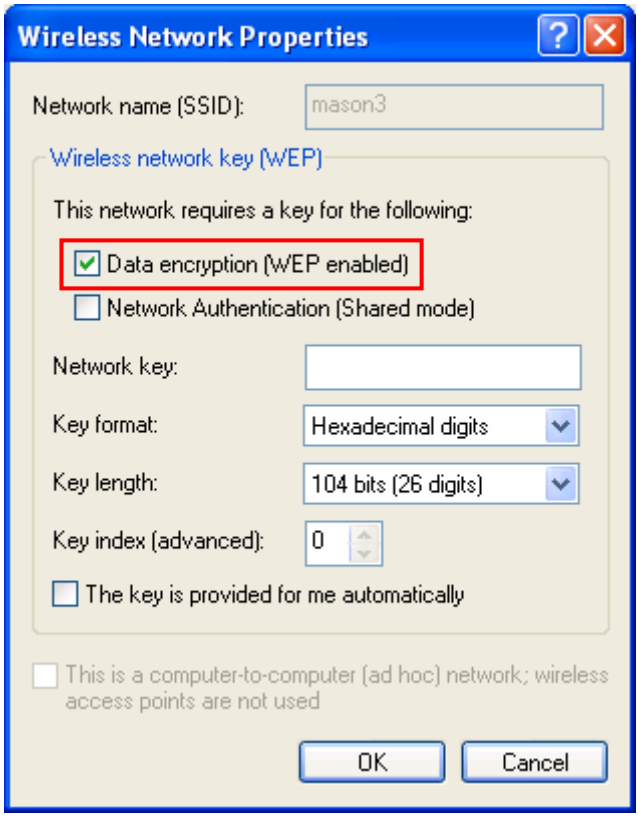


3. Click **WIRELESS Networks** to reconfigure the WIRELESS network connection.



4. If you need a key(WEP) to connect the WIRELESS network, you should keyin the key that supported by the WIRELESS network router or access point





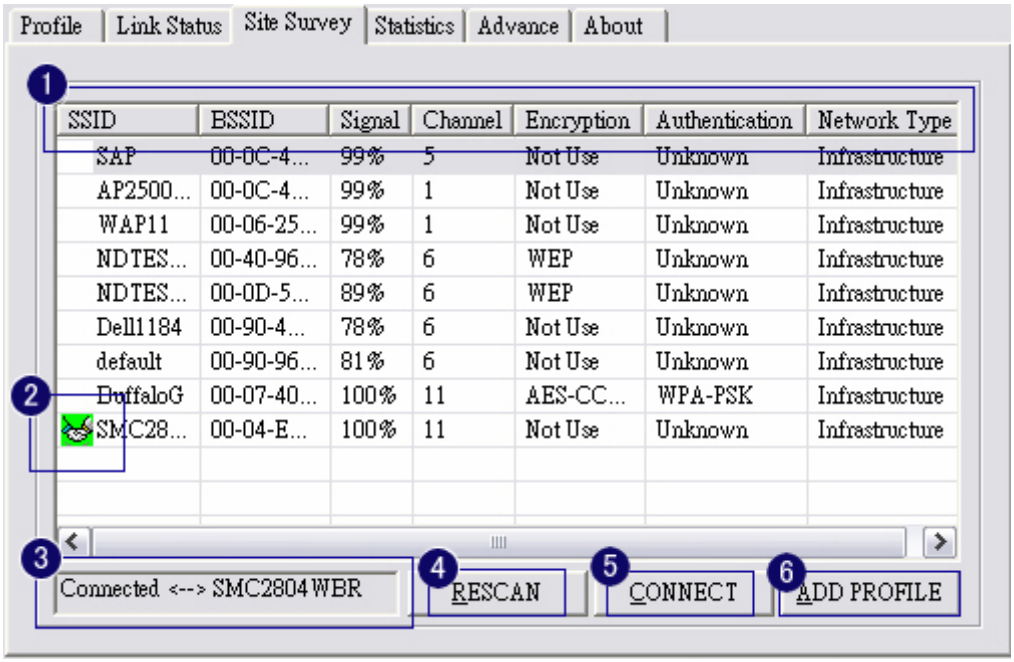
Note: Under the Windows XP, it is recommend to use the "***Automatic WIRELESS Network Configuration***" to configure your MIMO-G WIRELESS LAN Card. The WIRELESS LAN Utility comes with the WIRELESS LAN Card is not support the Windows XP.

Chapter 4 Configure with

“AirLive MIMO Wireless Utility” for Windows

98/ME/2000/XP

4-1 Site Survey Page



1. the means of item

- SSID : Name of AP
- BSSID : Mac Address of AP
- Signal : Signal strength of AP
- Channel : AP used channel
- Encryption : what encrypted mechanism does AP used, the encrypted mechanism contain four ways , WEP, AES, TKIP, NOT USE
- Authentication : What authentication mechanism does AP used.
- Network Type : What Network Type does the AP belong to.

2. The connected AP

- the system will choose the suitable AP when you start up utility in the first time
- if you want to connect with another AP, double click mouse's left button in the SSID of AP.
- indicate connect successful.

3. if the connect is success, it will show the SSID of the connected AP

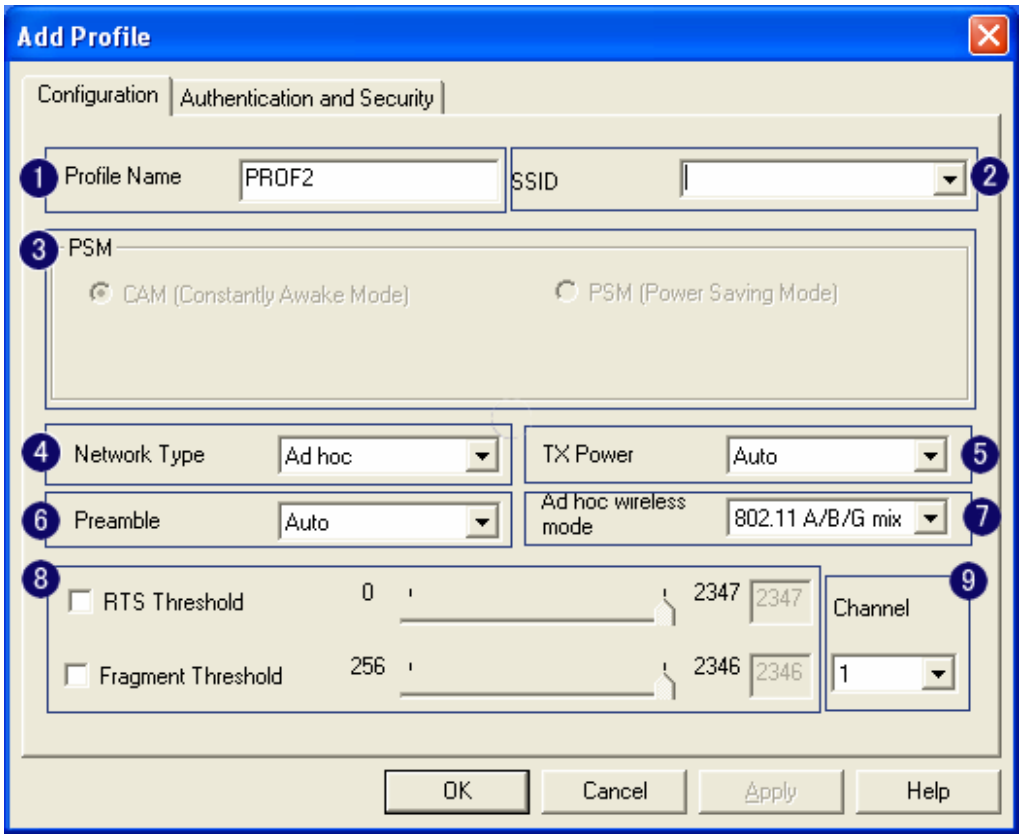
4. RESCAN rescan and upgrade all the AP's information in time

5. CONNECT connect with selected AP

6. ADD PROFILE Save the selected AP's information to Profile

4-1-1 Add/Edit Profile

System Configuration : as figure bellow



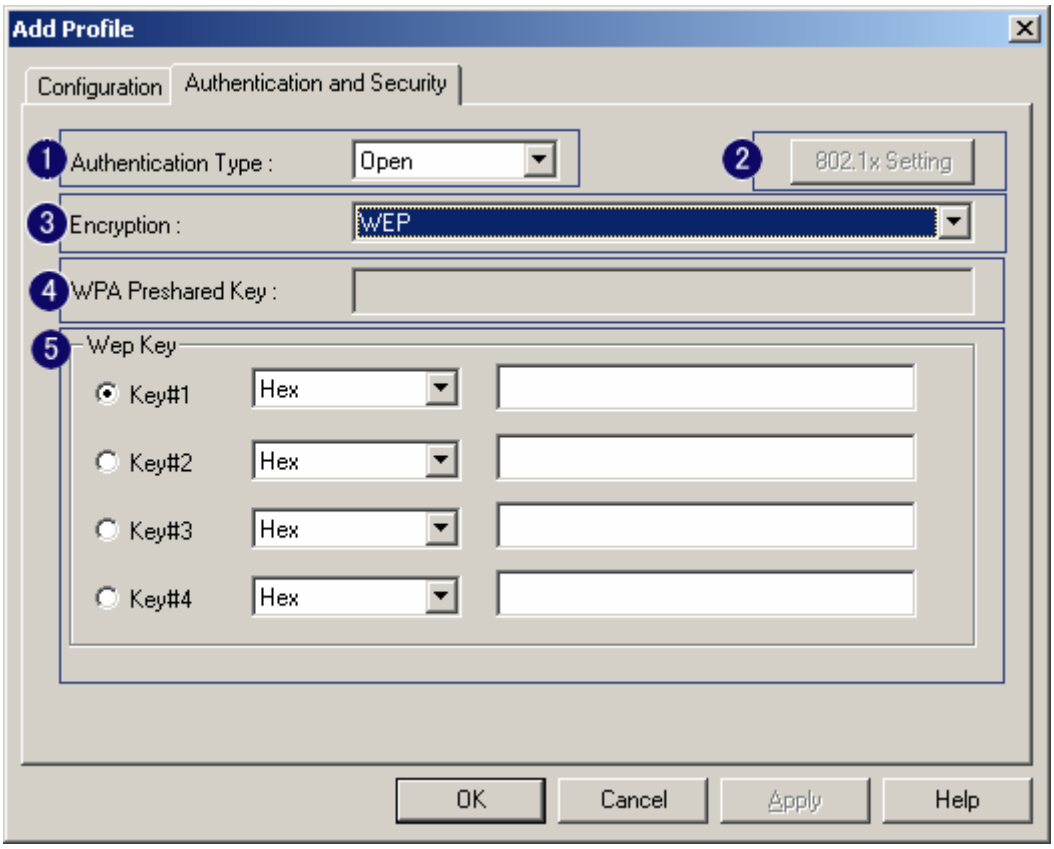
1. Profile Name: Different AP can be set up into different Profile Name
2. SSID: The drop-down menu can select which AP is detected by system
3. Power Save Mode: can select〔CAM（Constantly Awake Mode）〕 or 〔Power Saving Mode〕 mode. Selecting the" CAM when AC Power" means the power saving mode can automatically switch into CAM, if the computer uses the AC power, not using the batteries instead. Selecting the "Power Save Mode" can only work under the infrastructure mode.
4. Network Type: Can select "Infrastructure" or "802.11 Ad Hoc" mode. When set up to "Infrastructure" mode, the "Power Saving" mode will be enabled, but the "11b Preamble Type" will not; When set up to "802.11 Ad Hoc" mode, the "Power Saving Mode" will not be enabled, but "11b Preamble" will, and the channel selection in the session 7 will show up as well.
5. TX Power: Transmit power, the amount of power used by a radio transceiver to send the signal out. User can choose power value by sliding the bar.
6. Preamble: There are three types, Auto, Long and Short are supported.
7. Ad hoc wireless mode: There are five types. 802.11B only, 802.11 B/G mixed 802.11A only, 802.11a/b/g mixed and 802.11G only modes are supported.
8. RTS Threshold: User can adjust the RTS threshold number by sliding the bar or key in the value directly. The default value is 2312.
9. Fragment Threshold: User can adjust the RTS threshold number by sliding the bar or key in the value directly. The default value is 2312.

Note: Channel: Only available for setting under ad-hoc mode. User can choose the channel frequency to start their ad-hoc network.

Profile function is based on the needs to set up the most linkable AP in order to record the system configuration and to set up the authentication security. The function of each session is shown below

4-2 Authentication & Security

As shown in picture . When the Encryption feature is enabled, the other setups are same as the said WEP setting.

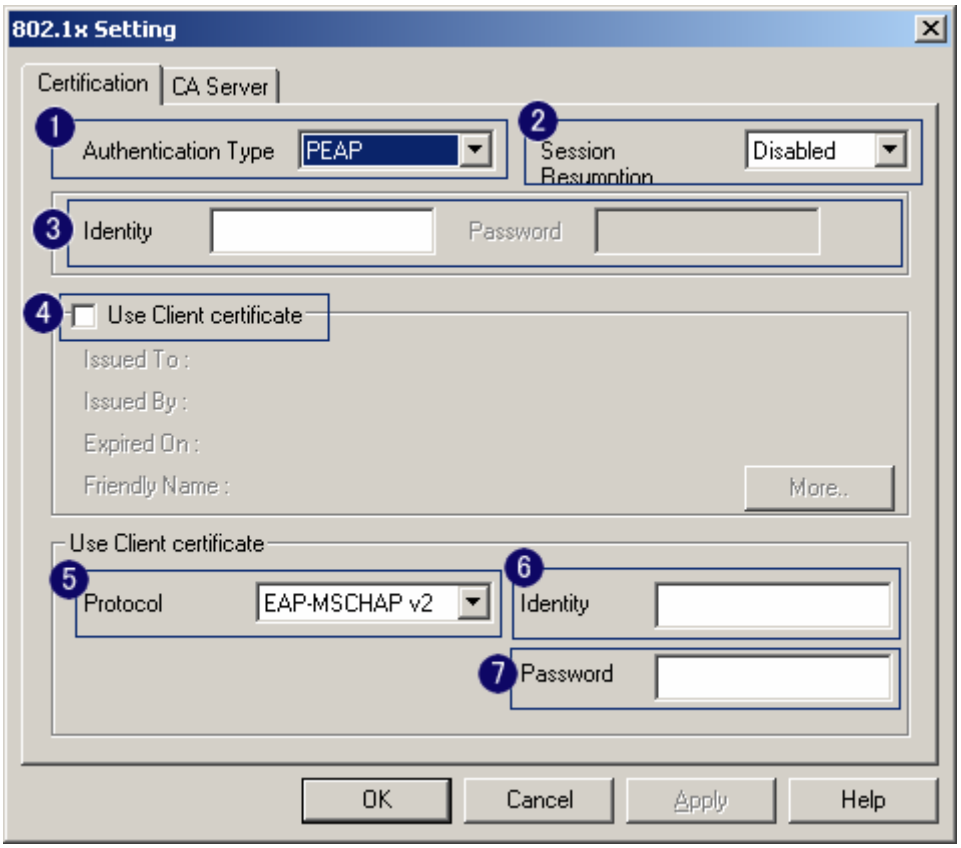


1. Authentication Type: There are three type of authentication modes supported by utility . They are open, Shared, WPA-PSK and WPA system.
2. 802.1x Setting: It will display to set when user use radius server to authenticate client certificate for WPA authentication mode. The detail operation will explain in section 5-6 Configure connection with WPA by 802.1x setting
3. Encryption Type: For open and shared authentication mode, the selection of encryption type are None and WEP. For WPA, WPA2, WPA-PSK and WPA2-PSK authentication mode, the encryption type supports both TKIP and AES.
4. WPA Pre-shared Key: This is the shared secret between AP and STA. For WPA-PSK and WPA2-PSK authentication mode, this field must be filled with character longer than 8 and less than 32 length.
5. WEP Key: Only valid when using WEP encryption algorithm. The key must matched AP key. There are several formats to enter the keys.
    i. Hexadecimal、40bits：10 Hex characters.
    ii. Hexadecimal、128bits：32Hex characters.

iii. ASCII、40bits：5 ASCII characters.

iv. ASCII、128bits：13 ASCII characters.

4-2-1 802.1x Setting



802.1x is a authentication for 『WPA』 and 『WPA2』 certificate to server. Show as figure

1. Authentication type:

i. PEAP: Protect Extensible Authentication Protocol. PEAP transport securely authentication data by using tunneling between PEAP clients and an authentication server. PEAP can authenticate wireless LAN clients using only server-side certificates, thus simplifying the implementation and administration of a secure wireless LAN.

ii. TLS／Smart Card: Transport Layer Security. Provides for certificate-based and mutual authentication of the client and the network. It relies on client-side and server-side certificates to perform authentication and can be used to dynamically generate user-based and session-based WEP keys to secure subsequent communications between the WLAN client and the access point.

iii. TTLS: Tunneled Transport Layer Security. This security method provides for certificate-based, mutual authentication of the client and network through an

encrypted channel. Unlike EAP-TLS, EAP-TTLS requires only server-side certificates.

iv. LEAP: Light Extensible Authentication Protocol. It is an EAP authentication type used primarily in Cisco Aironet WLANs. It encrypts data transmissions using dynamically generated WEP keys, and supports mutual authentication.

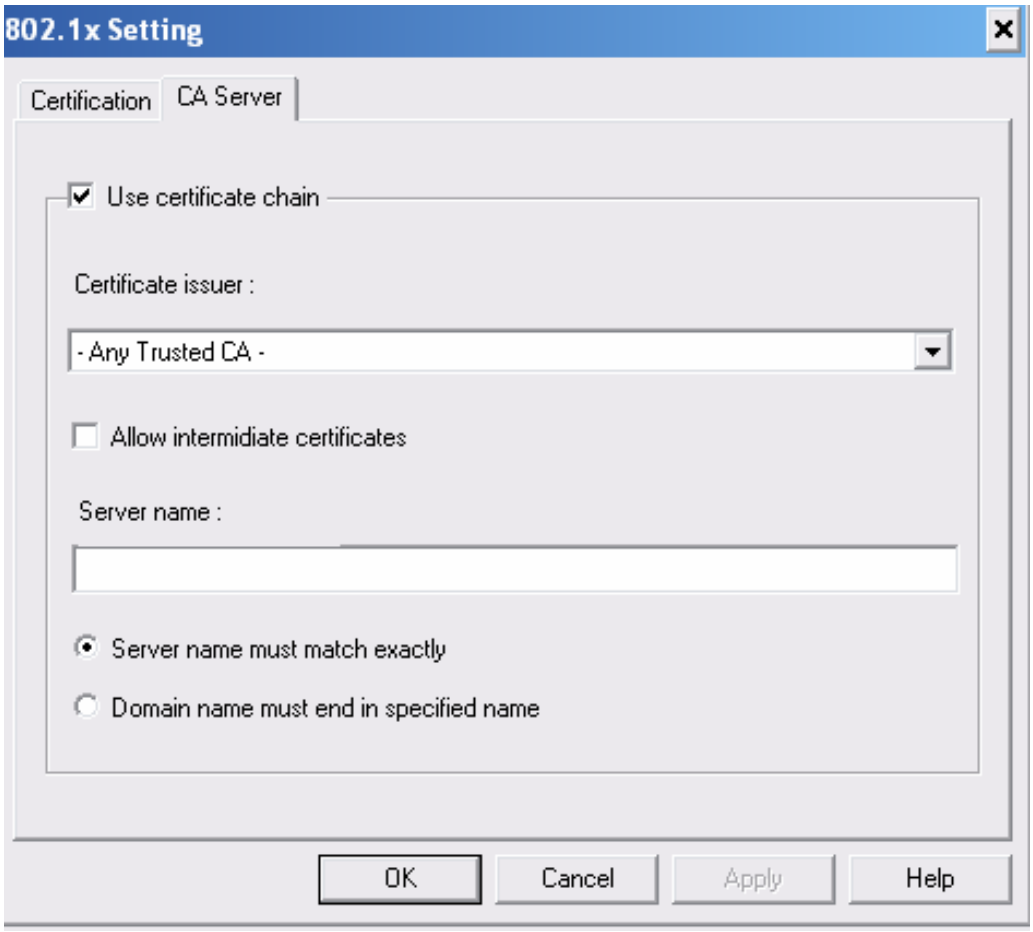
v. MD5-Challenge: Message Digest Challenge. Challenge is an EAP authentication type that provides base-level EAP support. It provides for only one-way authentication - there is no mutual authentication of wireless client and the network.

2. Session Resumption: user can choose “ Disable ”, “ Reauthentication ”, “ Roaming ”, “ SameSsid ” and “ Always ”.
3. Identity and Password: Identity and password for server.
4. Use Client Certicate: Client Certicate for server authentication.
5. Tunnel Authentication
   i. Protocol: Tunnel protocol, List information include “ EAP-MSCHAP ”, “ EAP-MSCHAP v2 ”, “ CAHAP ” and “ MD5 ”
   ii. Tunnel Identity: Identity for tunnel.
   iii. Tunnel Password: Password for tunnel.
6. CA Server: Certificate Authority Server. Each certificate is signed or issued by it. The detail operation will explain in section 4-2-2 CA Server

4-2-2 CA Server

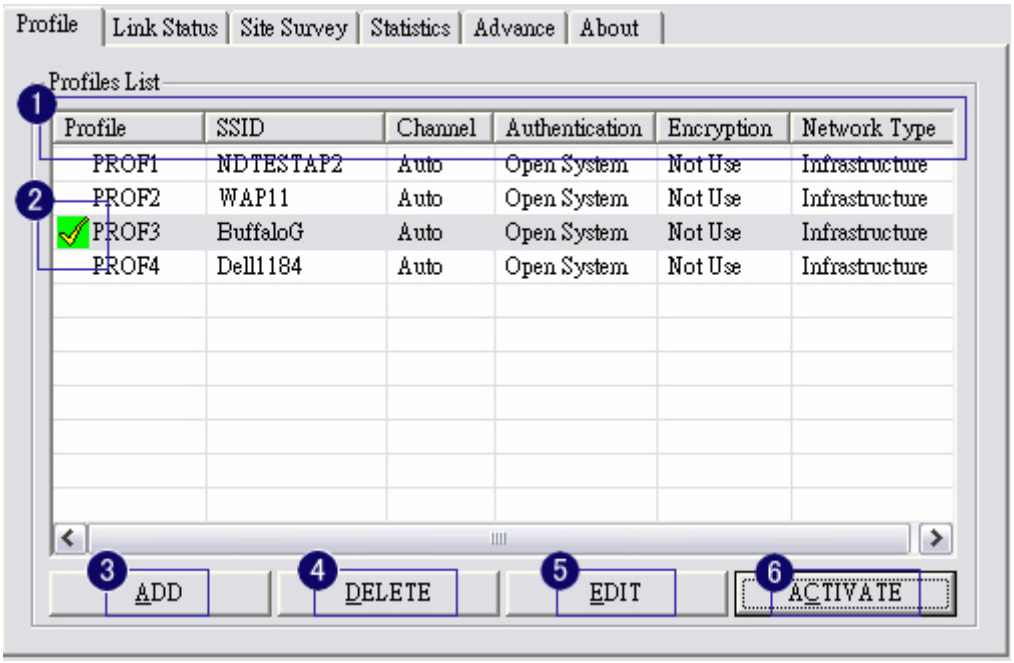
Depending on the EAP in use, only the server or both the server and client may be authenticated and require a certificate. Server certificates identify a server, usually an authentication or RADIUS server to clients. Most EAPs require a certificate issued by a root authority or a trusted commercial CA. Show as the figure.

1. Certificate issuer: Choose use server that issuer of certificates.
2. Allow intimidate certificates: It must be in the server certificate chain between the server certificate and the server specified in the certificate issuer must be field.
3. Server name: Enter an authentication sever root.


802.1x Setting
Certification
CA Server
Use certificate chain
Certificate issuer :
- Any Trusted CA -
Allow intermidiate certificates
Server name :
Server name must match exactly
Domain name must end in specified name
OK
Cancel
Apply
Help

4-3 Profile Page

Profile can book keeping your favorite wireless setting among your home, office, and other public hotspot. You may save multiple profiles, and activate the correct one at your preference.



1. Definition of each field:
   - i. Profile: Name of profile, preset to PROF* (* indicate 1, 2, 3,).
   - ii. SSID: AP or Ad-hoc name.
   - iii. Cannel: Channel in use for Ad-Hoc mode.
   - iv. Authentication: Authentication mode.
   - v. Encryption: Security algorithm in use.
   - vi. Network Type: Network's type, icluding infrastructure and Ad-Hoc.

2. Connection status

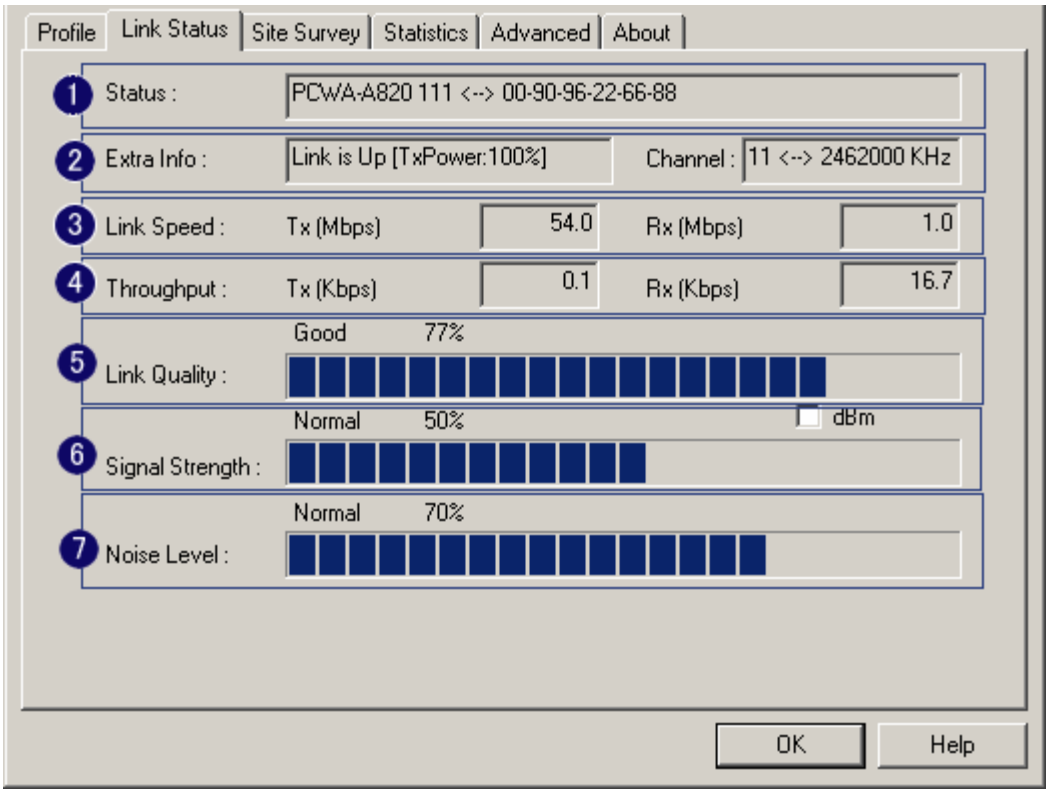
Indicate connection is successful on currently activated profile.

Indicate connection is failed on currently activated profile.

3. Add a new profile.
4. Delete an existing profile.
5. Edit Profile
6. Activate selected profile.

4-4 Link Status Page

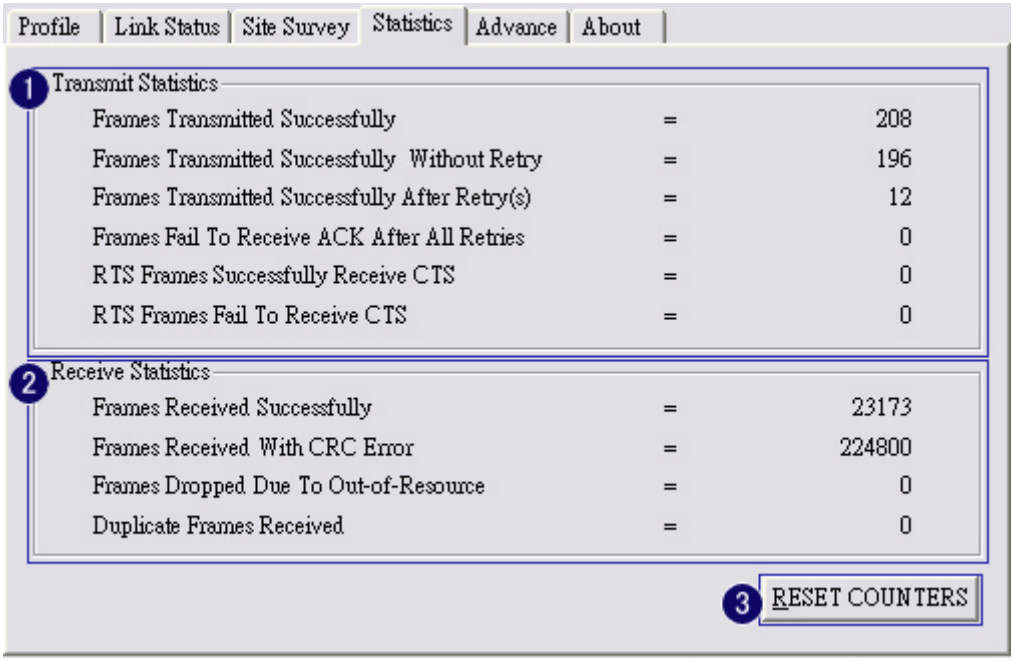
Show the information of linking status. As show in picture 20, the description of each session is said as following:



1. Status: Current connection status. If no connection, if will show Disconnected. Otherwise, the SSID and BSSID will show here.
2. Extra Info: Display link status and current channel in use.
3. Link Speed: Show current transmit rate and receive rate.
4. Throughout: Display transmits and receive throughput in unit of K bits/sec.
5. Link Quality: Display connection quality based on signal strength and TX/RX packet error rate.
6. Signal Strength: Receive signal strength, user can choose to display as percentage or dBm format
7. Noise Level: Display noise signal strength.

4-5 Statistics Page

Statistics page displays the detail counter information based on 802.11 MIB counters. This page translates that MIB counters into a format easier for user to understand.



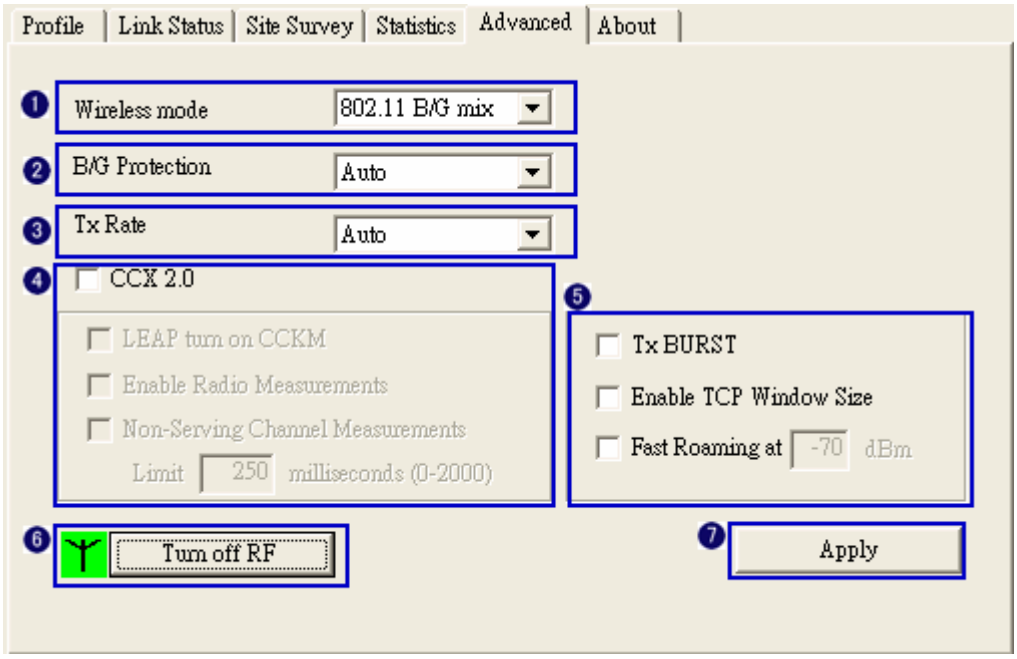
1. Transmit Statistics:
    i. Frames Transmitted Successfully: Frames successfully sent.
    ii. Frames Transmitted Successfully Without Retry: Frames successfully sent without any retry.
    iii. Frames Transmitted Successfully After Retry: Frames successfully sent with one or more reties.
    iv. Frames Fail To Receive ACK After All Retries: Frames failed transmit after hitting retry limit.
    v. RTS Frames Successfully Receive CTS: Successfully receive CTS after sending RTS frame.
    vi. RTS Frames Fail To Receive CTS: Failed to receive CTS after sending RTS.

2. Receive Statistics:
    i. Frames Received Successfully: Frames received successfully.
    ii. Frames Received With CRC Error: Frames received with CRC error.
    iii. Frames Dropped Due To Out-of-Resource: Frames dropped due to resource issue.
    iv. Duplicate Frames Received: Duplicate received frames.

3. RESET COUNTERS To zero the statistic numbers of transmitting and receiving data.

Advance Page

The advance setting is shown as follows. The description of each session is said as following:



1. Wireless mode: Select wireless mode. 802.11B only, 802.11 B/G mixed 802.11A only, 802.11 a/b/g mixed and 802.11G only modes are supported.
2. 11B/G Protection: ERP protection mode of 802.11G definition. User can chosse from Auto, On, and Off
    i. Auto: STA will dynamically change as AP announcement.
    ii. On: Always send frame with protection.
    iii. Off: Always send frame without protection.

3. TX Rate: Manually force the Transmit using selected rate. Default is auto.
4. CCX2.0: support Cisco Compatible Extensions function:
    i. LEAP turn on CCKM
    ii. Enable Radio Measurement: can channel measurement every 0~2000 milliseconds.
5. Tx Burst: AirLive's proprietary frame burst mode.
6. Wireless radio signal control

-

: means to open the wireless radio signal and show simultaneously:
-

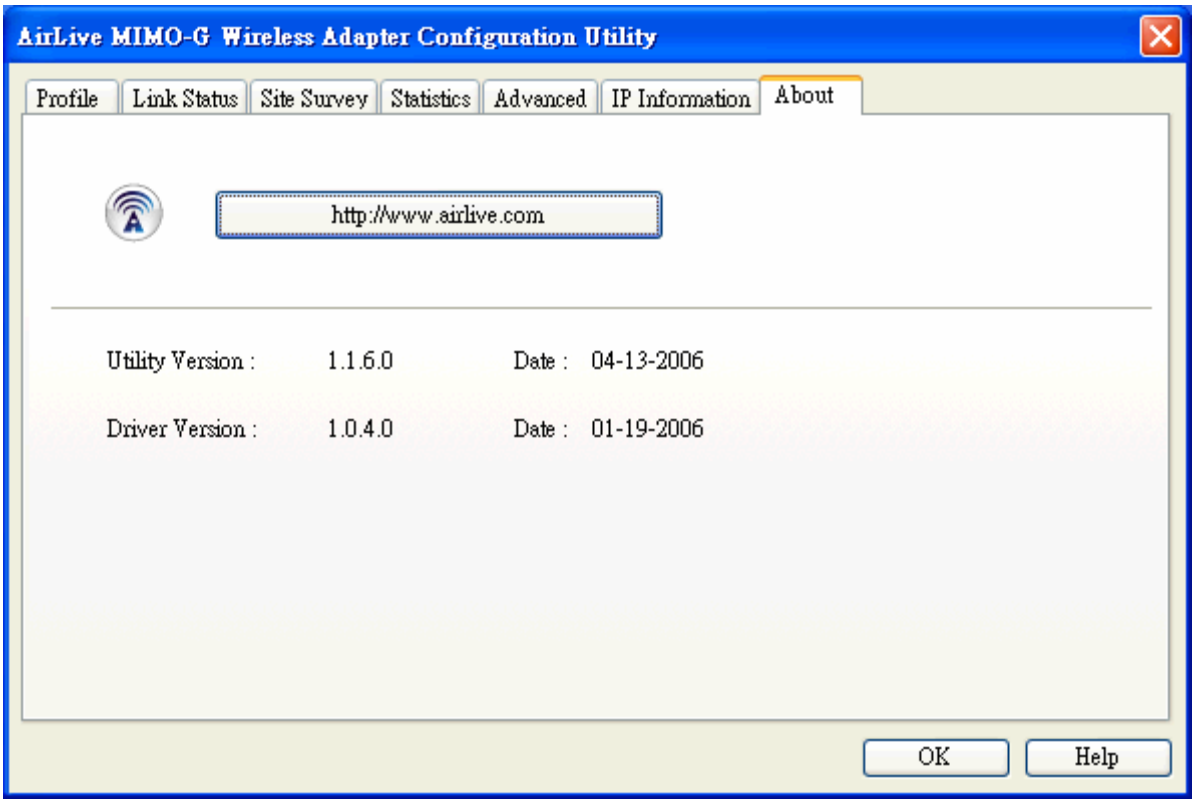
: means to close the wireless radio signal and show simultaneously:

7. Apply

Means the modification of session 1~4 are formally used.

4-6 About Page

About page display the wireless card and driver version information shown as follow figure .

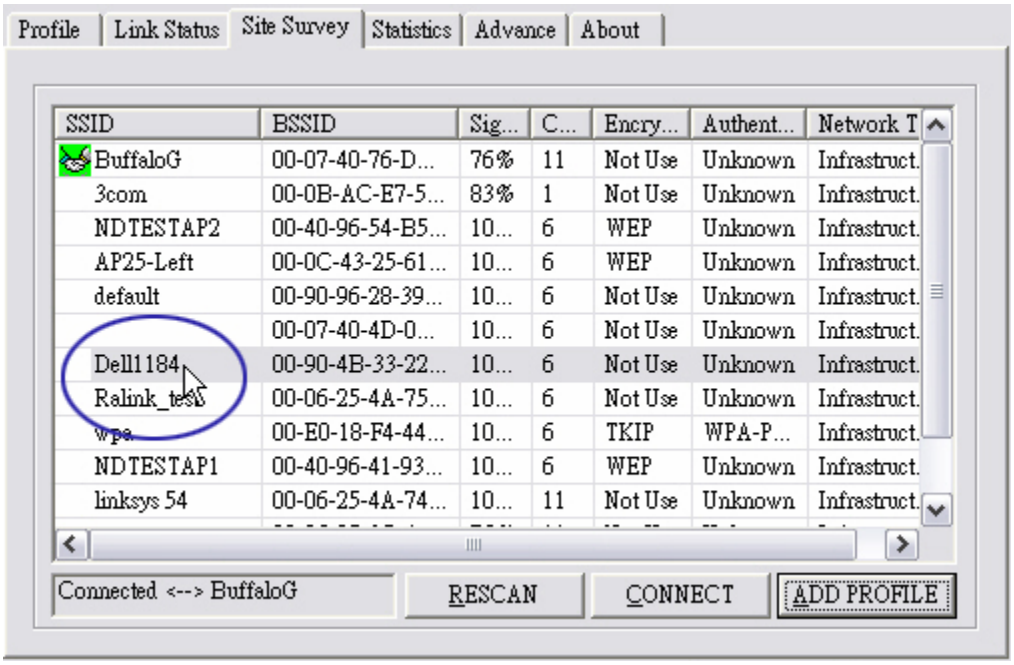


1. Connect to AirLive website: *www.airlive.com*
2. Display Configuration Utility, Driver,

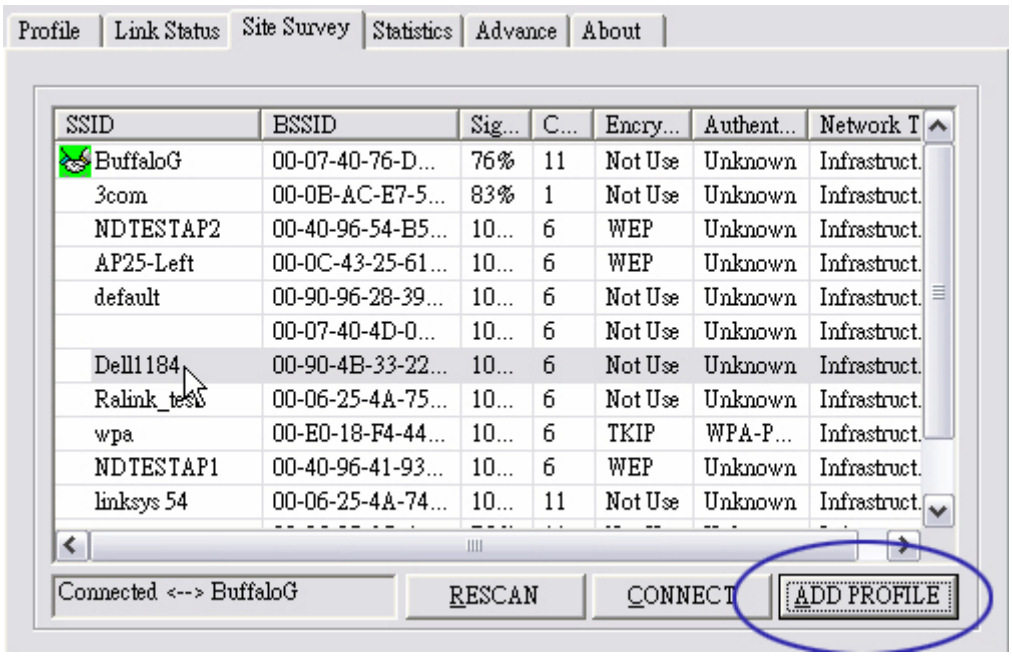
Chapter 5 Example

5-1 Adding profile in site survey page

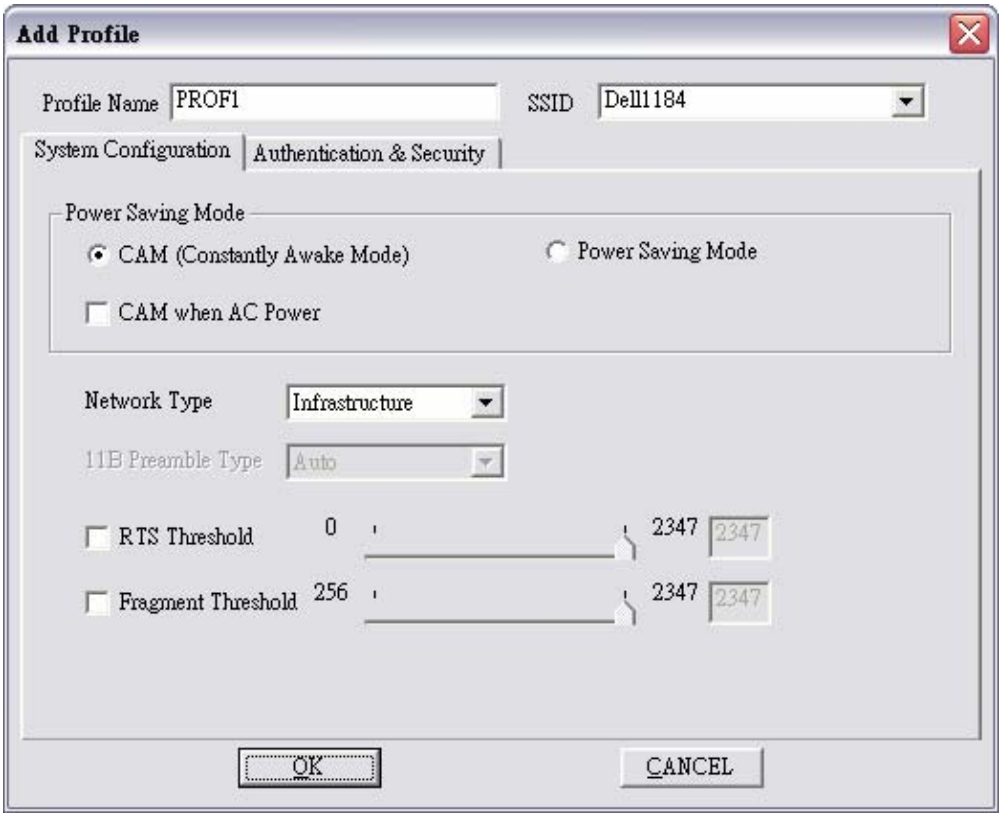
1. Select the indented network from site survey list.



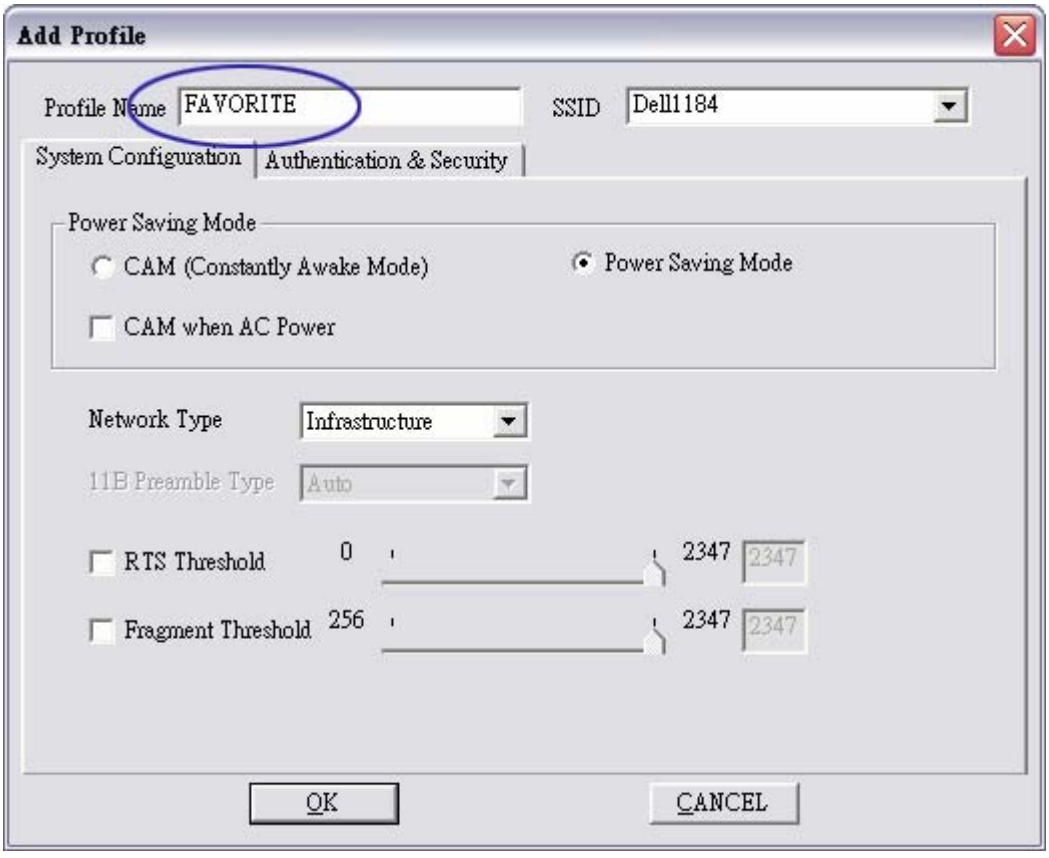
2. Click ADD PROFILE.



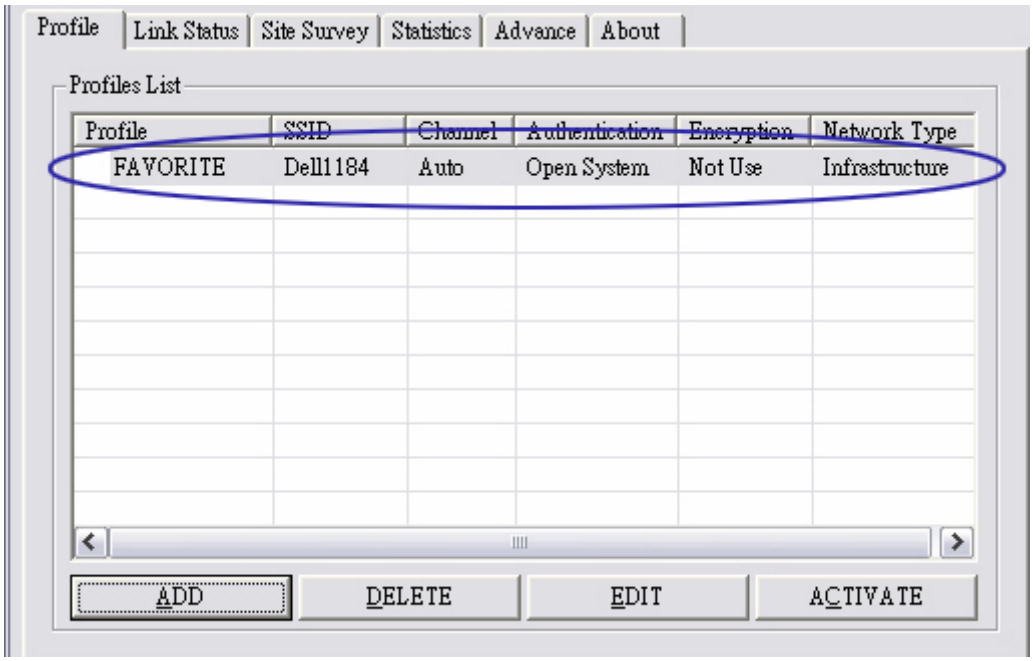
3. System will pop up Add Profile windows



4. Change profile Name from PROF1 to FAVORITE.

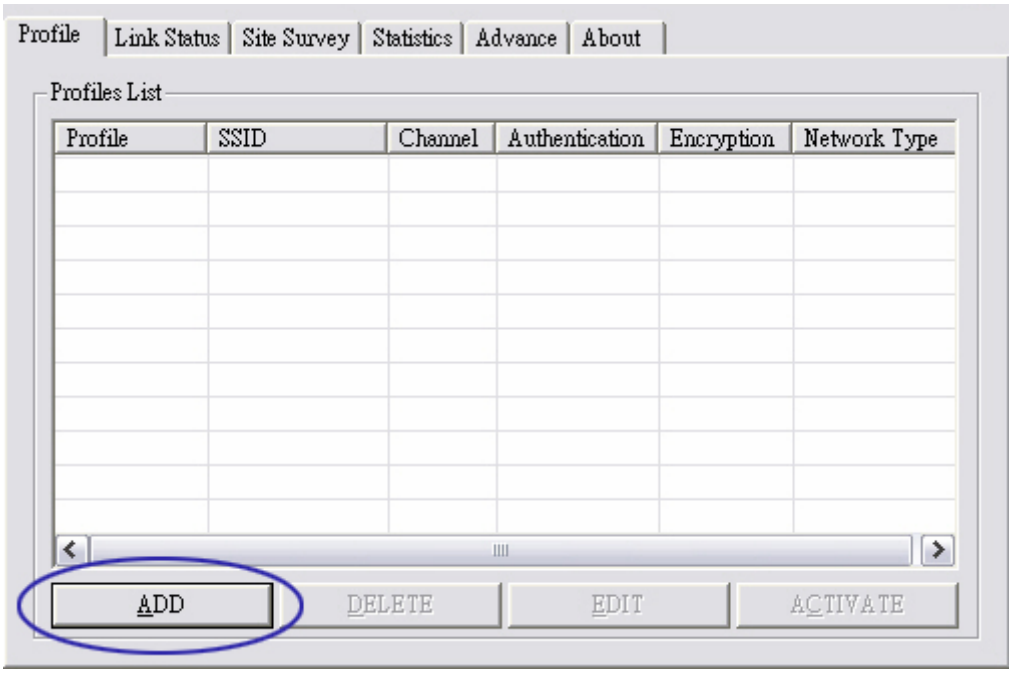


5. Click OK without changing other value.

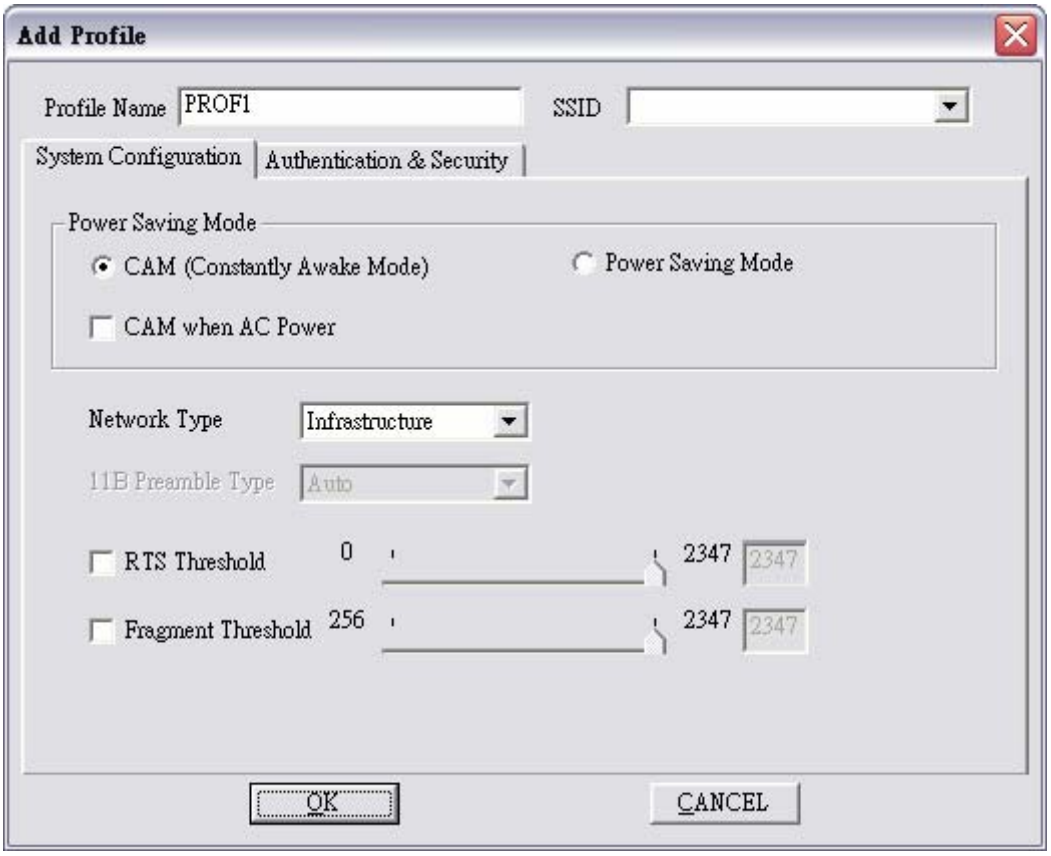

Profile
Link Status
Site Survey
Statistics
Advance
About
Profiles List
Profile
SSID
Channel
Authentication
Encryption
Network Type
FAVORITE
Dell1184
Auto
Open System
Not Use
Infrastructure
ADD
DELETE
EDIT
ACTIVATE

5-2 Add profile in profile page

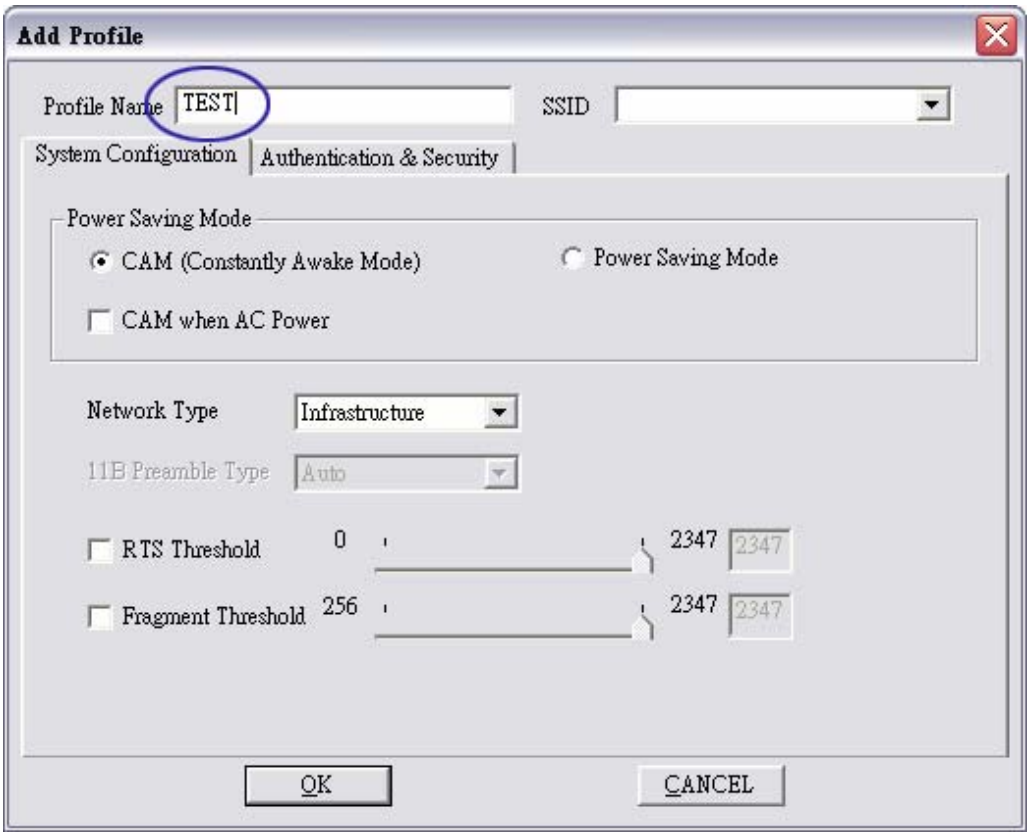
1. Click ADD in profile page



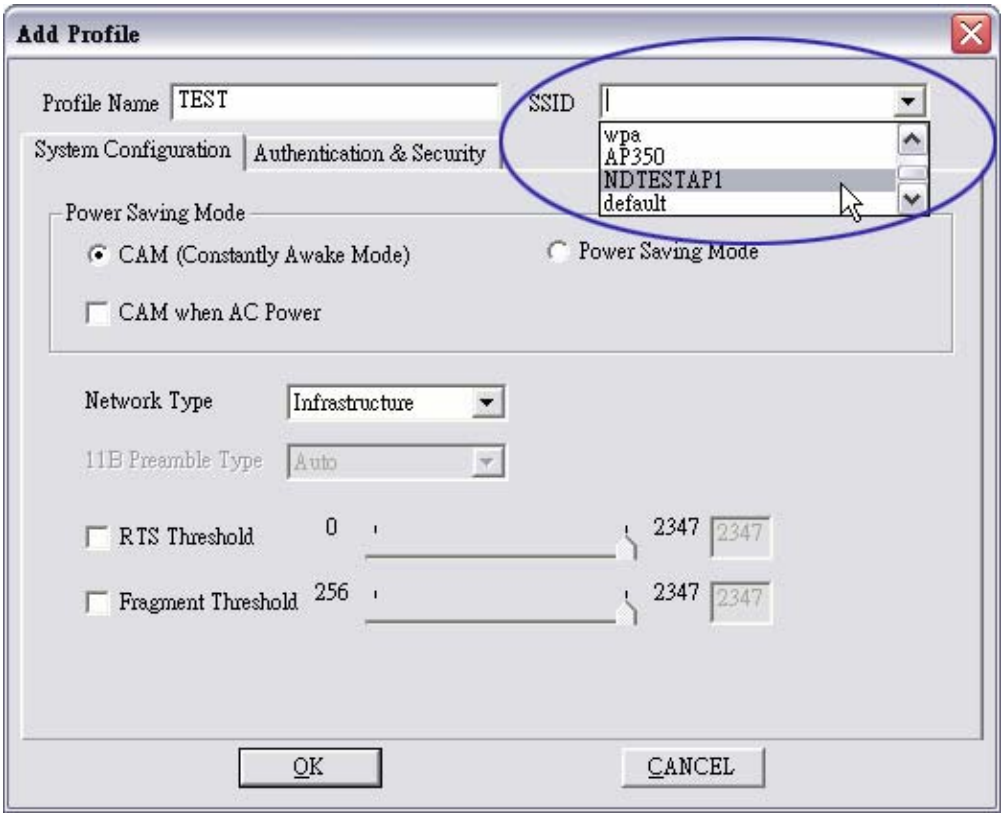
2. Add Profile page will pop up



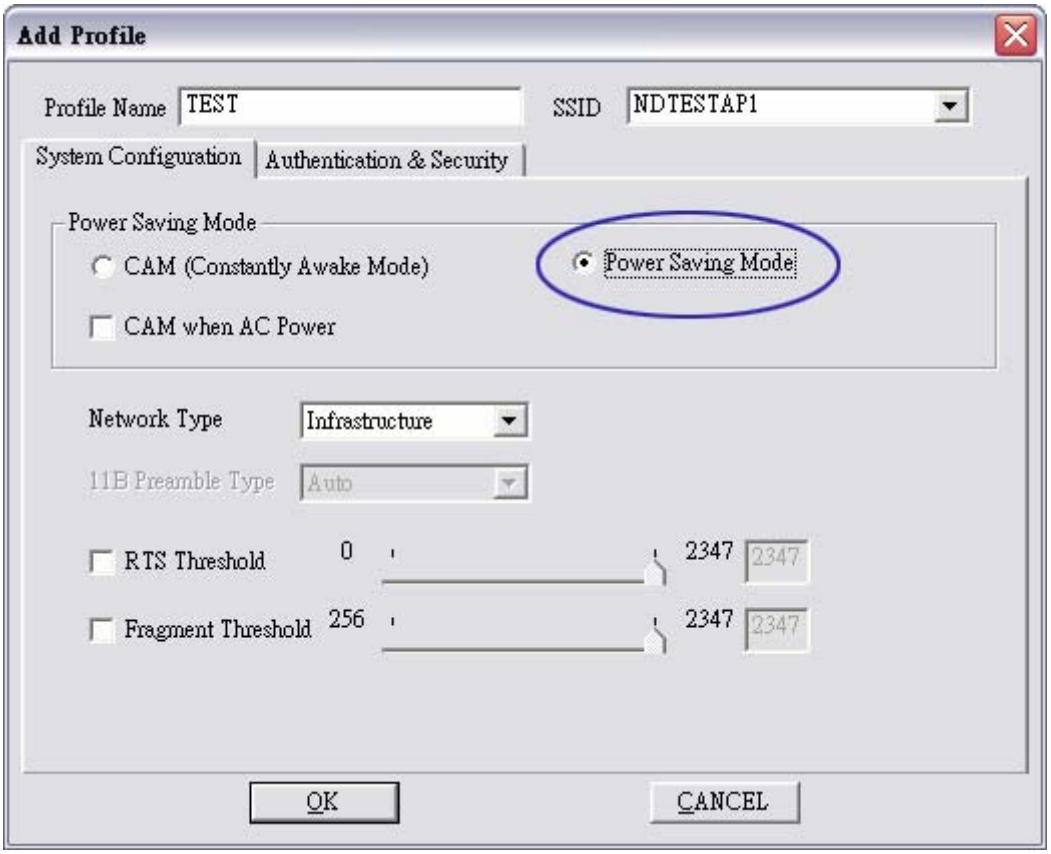
3. Change profile name to TEST.



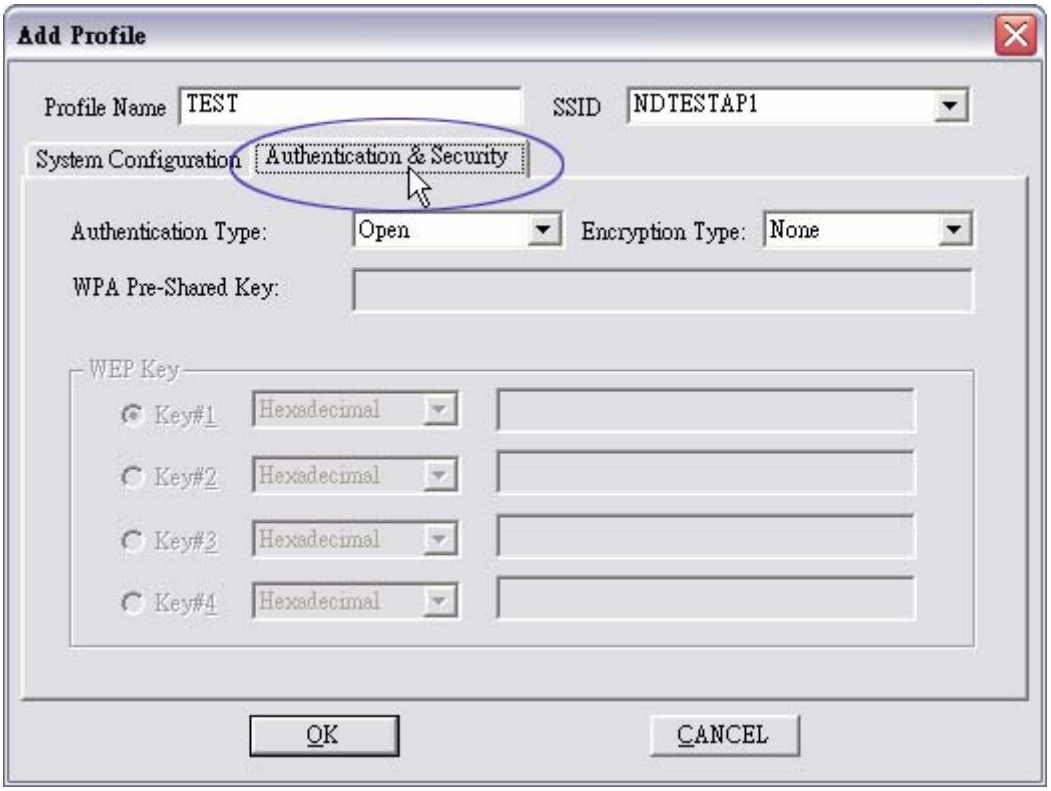
4. Pull down SSID and select one intended AP. The AP list is the result of last site survey.



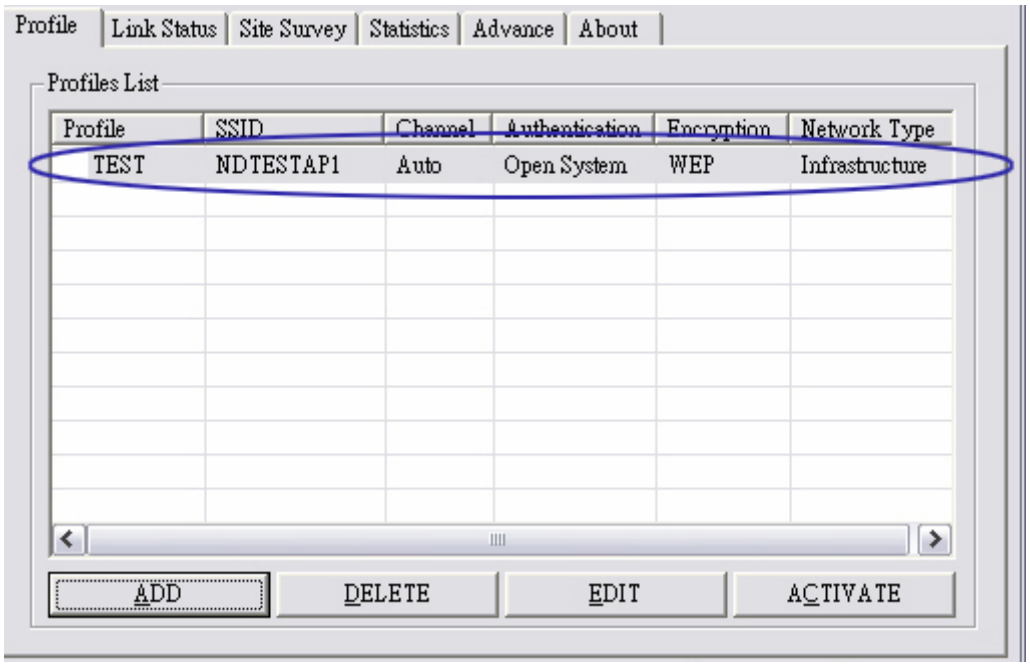
5. Set Power Saving Mode.



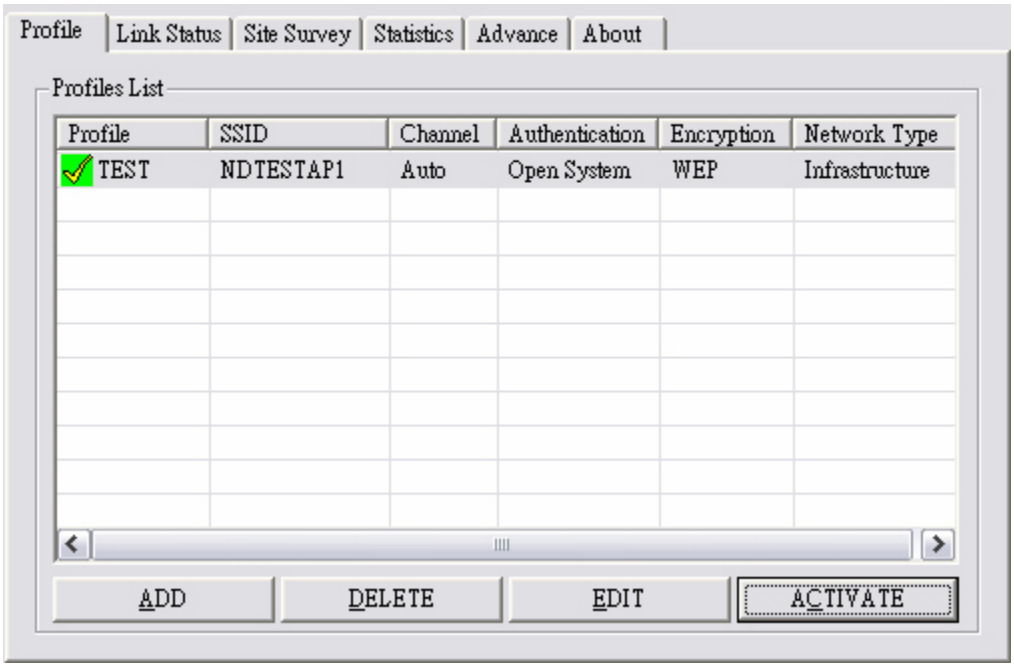
6. Click Authentication & Security page



7. Click OK. Then we can find the profile name appears in the grid.

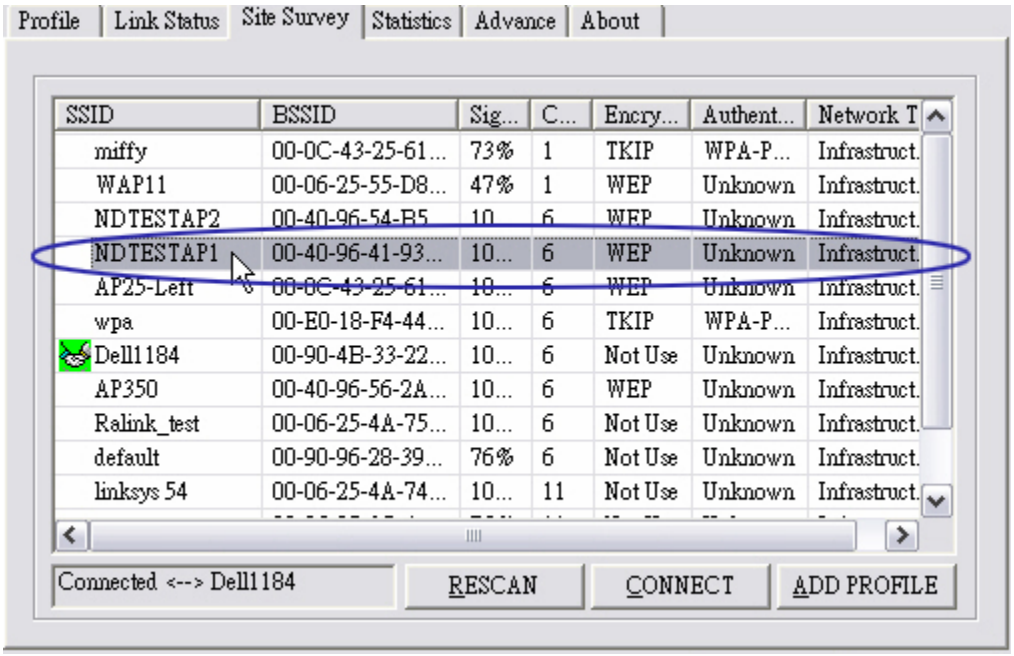


8. Click ACTIVATE. Activate the profile setting.

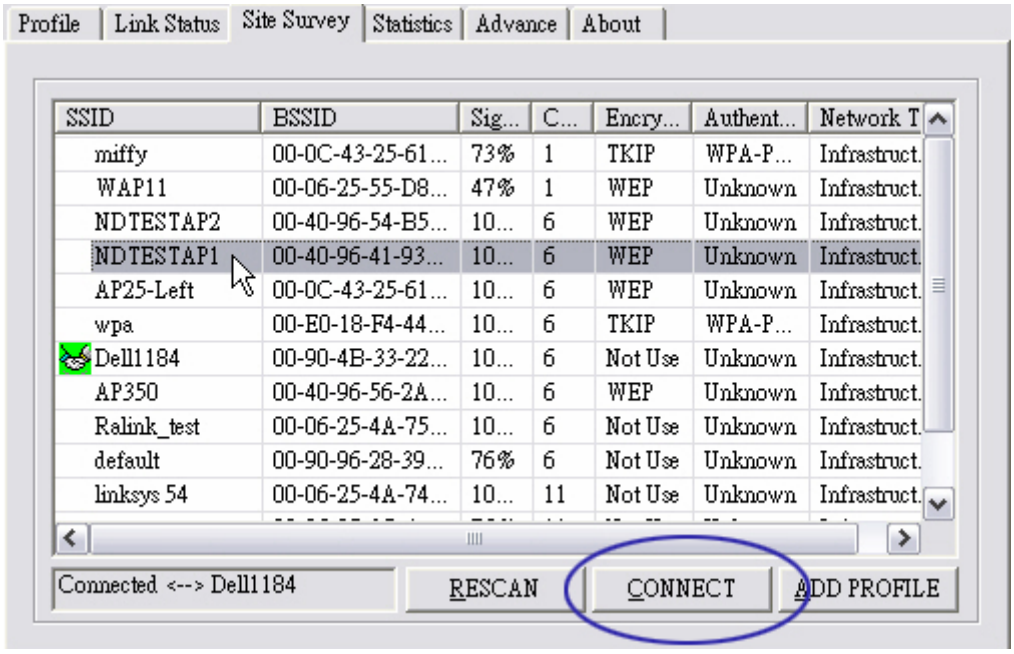


5-3 WEP encryption

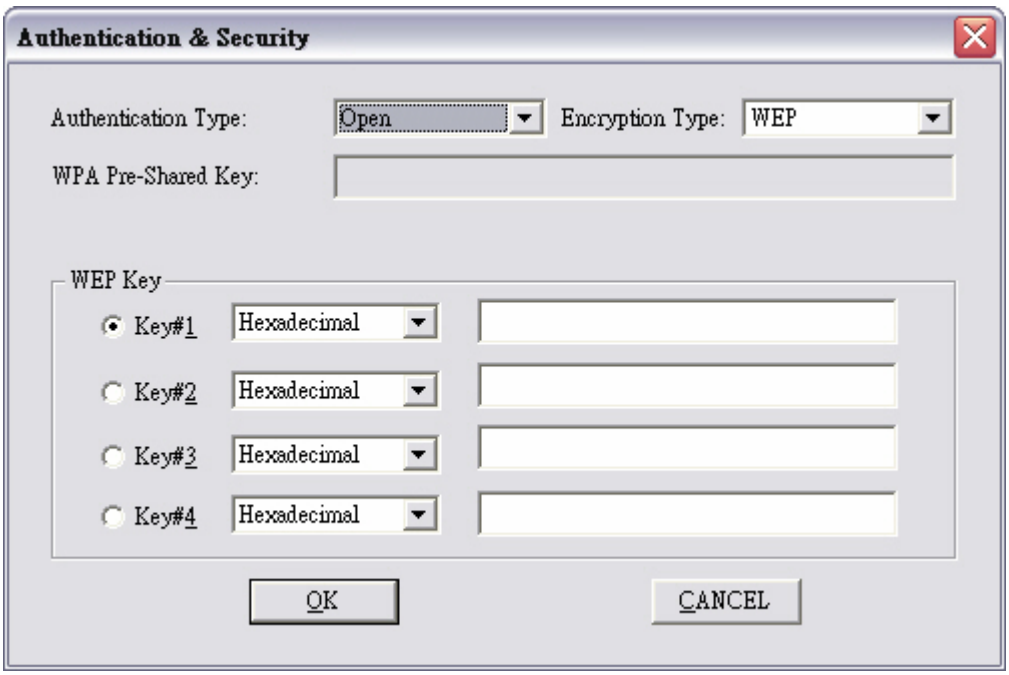
1. Select AP with WEP encryption.



2. Click CONNECT or doucle click intended network.

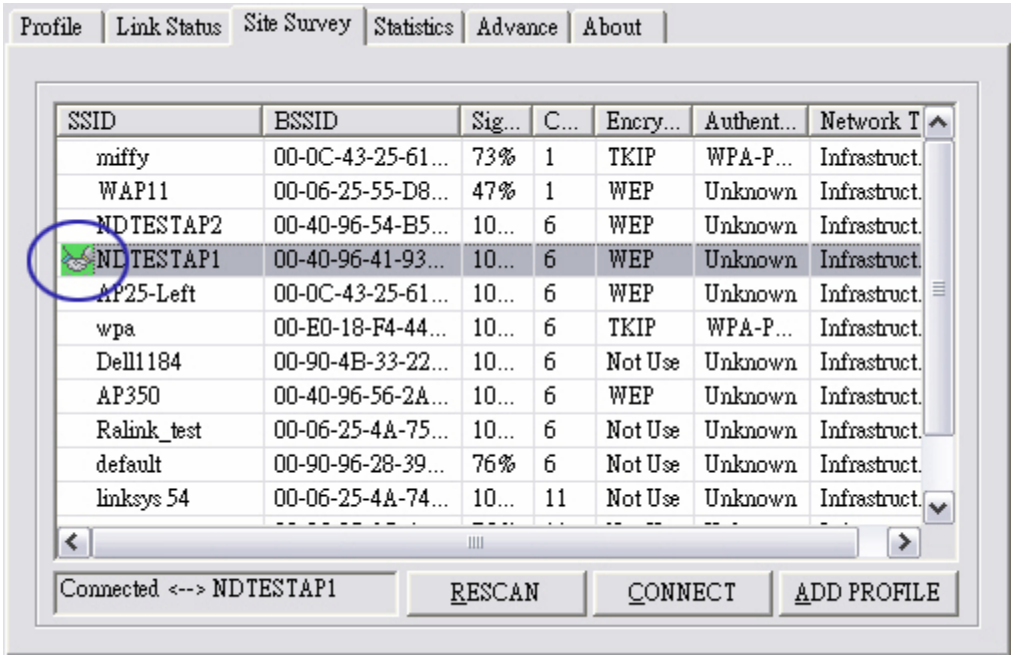


3. Authentication & Security page pop up.



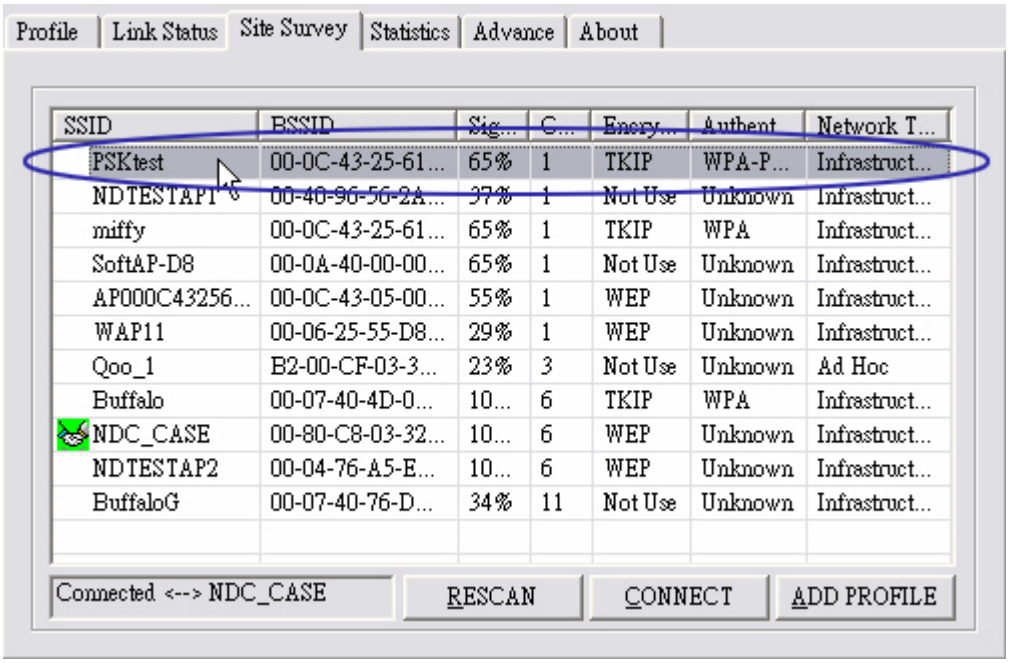
4. Enter 0123456789 at Key#1 which is same as our intended AP's setting.

5. Click OK. The result will look like the below figure.

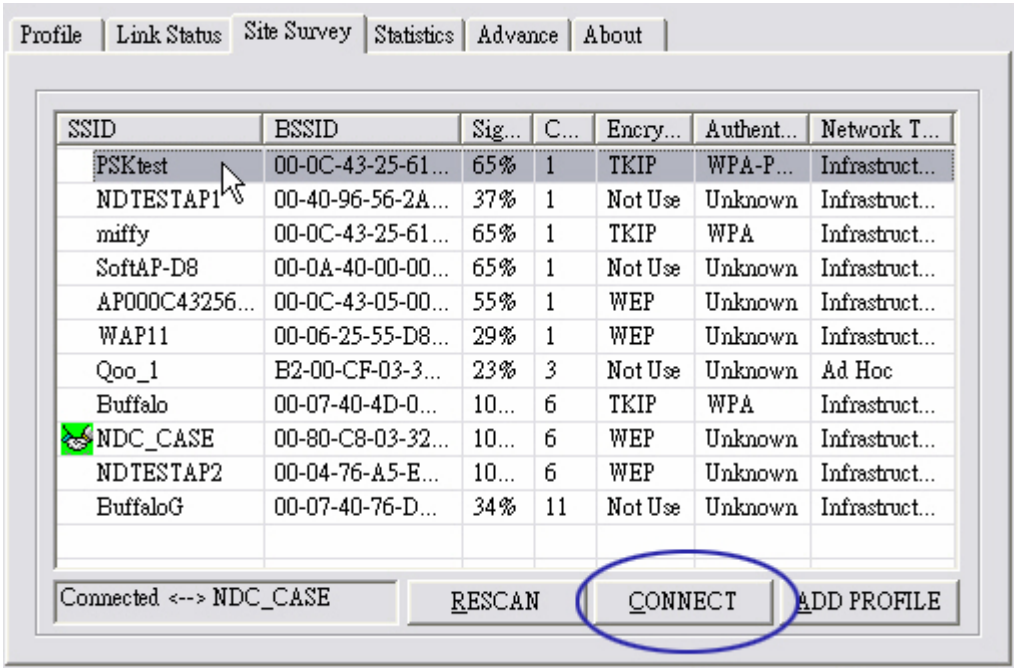

Profile
Link Status
Site Survey
Statistics
Advance
About
SSID
BSSID
Sig...
C...
Encry...
Authent...
Network T
miffy 00-0C-43-25-61... 73% 1 TKIP WPA-P... Infrastruct.
WAP11 00-06-25-55-D8... 47% 1 WEP Unknown Infrastruct.
NDTESTAP2 00-40-96-54-B5... 10... 6 WEP Unknown Infrastruct.
NDTESTAP1 00-40-96-41-93... 10... 6 WEP Unknown Infrastruct.
AP25-Left 00-0C-43-25-61... 10... 6 WEP Unknown Infrastruct.
wpa 00-E0-18-F4-44... 10... 6 TKIP WPA-P... Infrastruct.
Dell1184 00-90-4B-33-22... 10... 6 Not Use Unknown Infrastruct.
AP350 00-40-96-56-2A... 10... 6 WEP Unknown Infrastruct.
Ralink_test 00-06-25-4A-75... 10... 6 Not Use Unknown Infrastruct.
default 00-90-96-28-39... 76% 6 Not Use Unknown Infrastruct.
linksys 54 00-06-25-4A-74... 10... 11 Not Use Unknown Infrastruct.
Connected <--> NDTESTAP1
RESCAN
CONNECT
ADD PROFILE

5-4 Configure connection with WPA-PSK

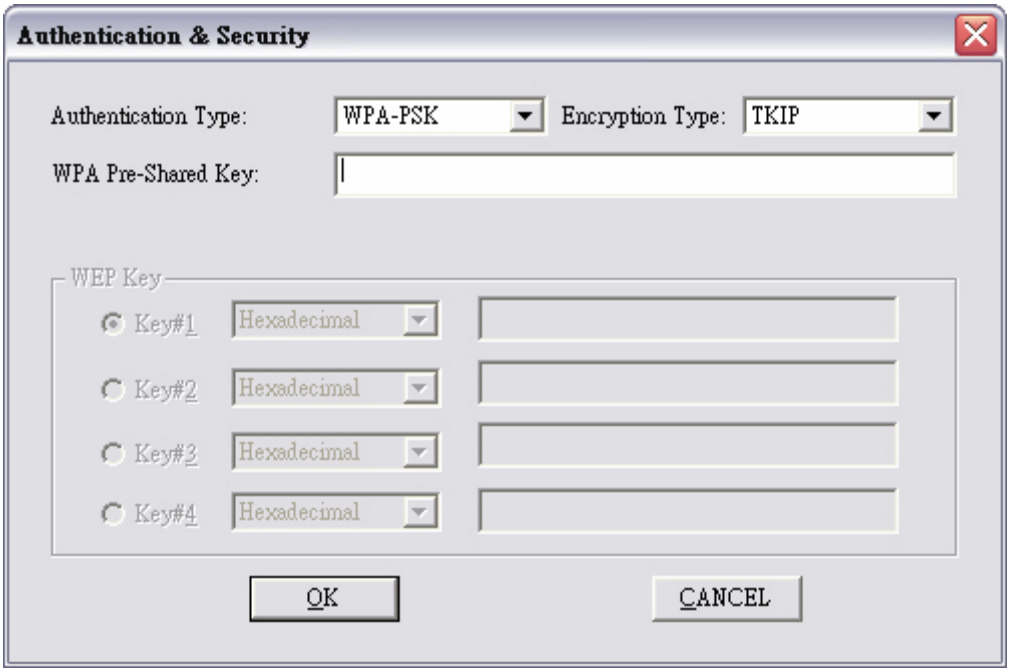
1. Select the AP with WPA-PSK authentication mode.



2. Click CONNECT or double click the intended network.

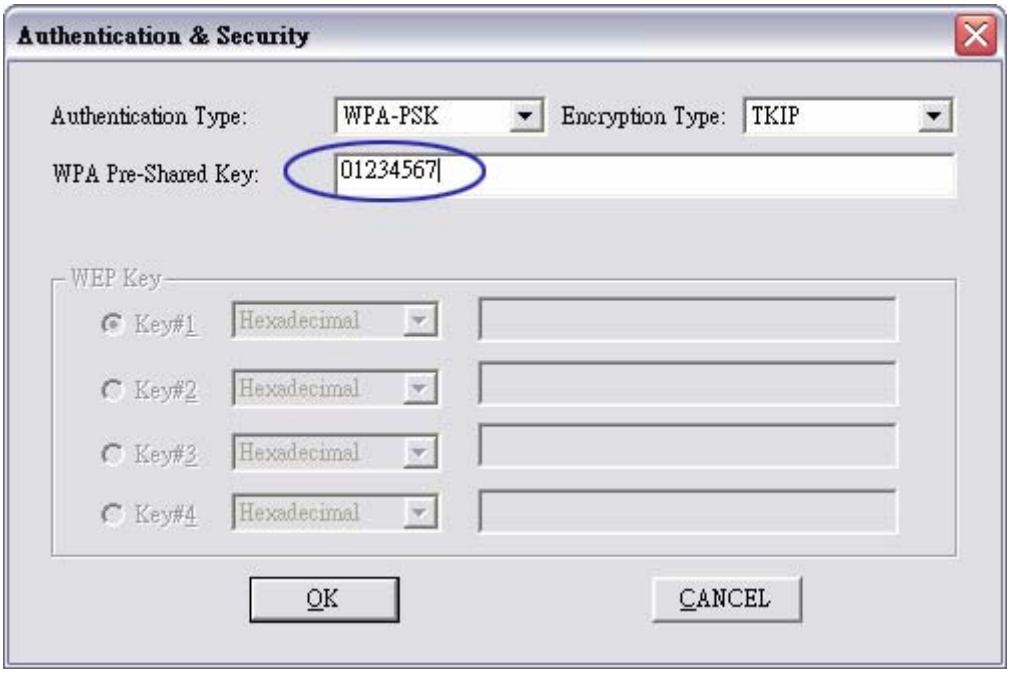


3. Authentication & Security page will pop up.



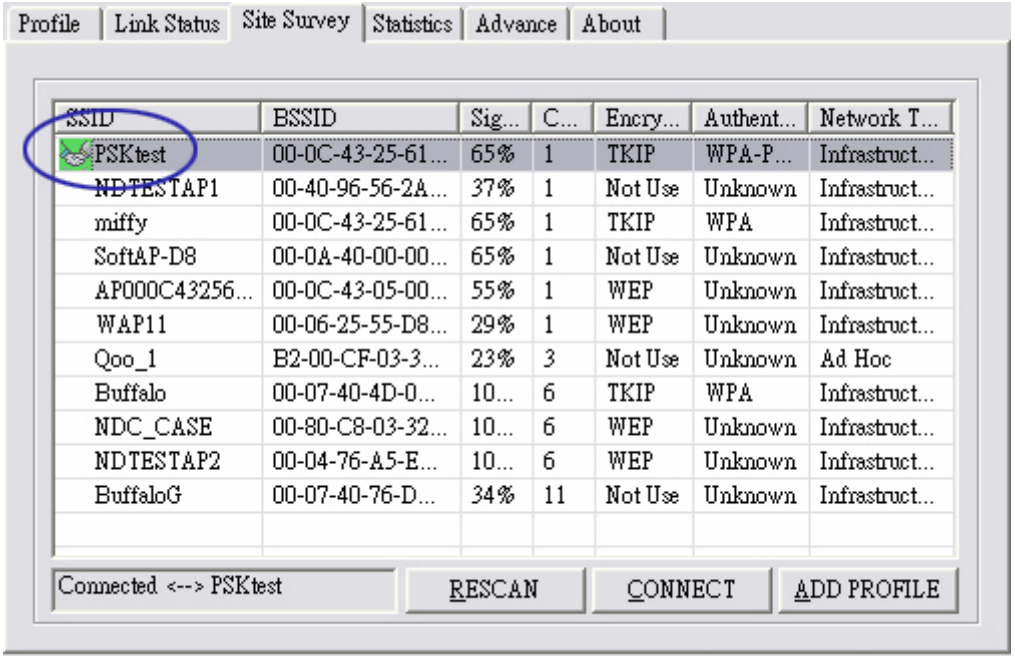
*If AP setup security to 〝Both〞(TKIP + AES), system define is AES that security is severely.

4. Authentication Type is WPA-PSK. Select correct encryption (TKIP or AES).Enter WPA Pre-Shared Keysecret as 01234567.



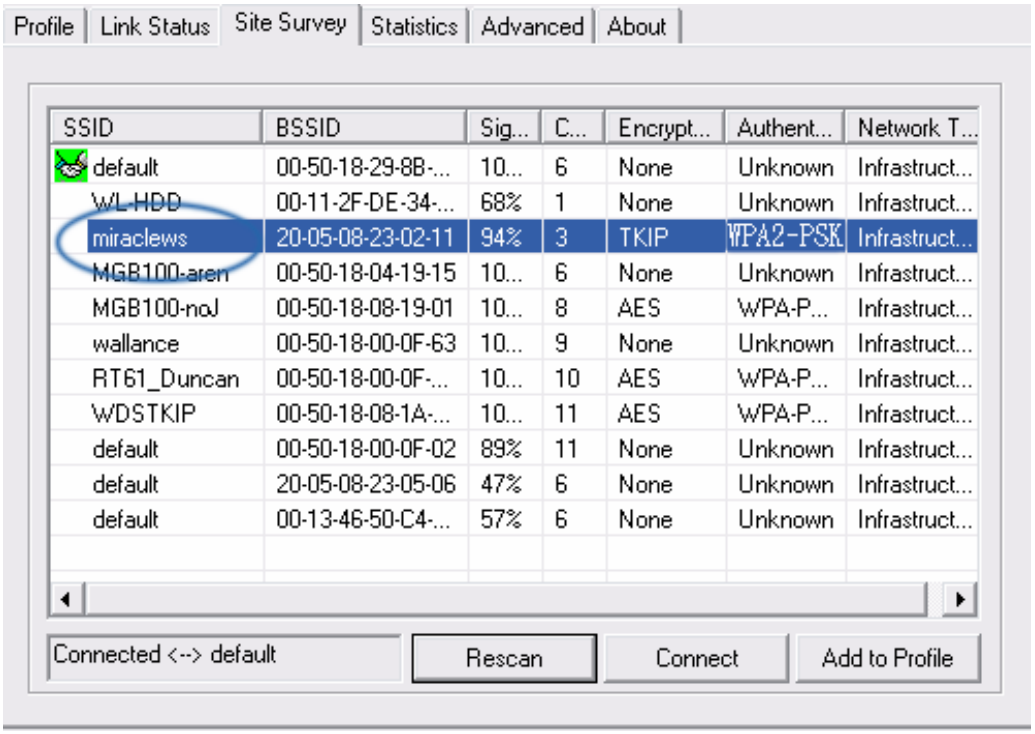
5. Click OK. Be careful, if the WPA Pre-Shared Key entered is not correct, even though the AP

can be connected, but you won't be able to exchange any data frames.

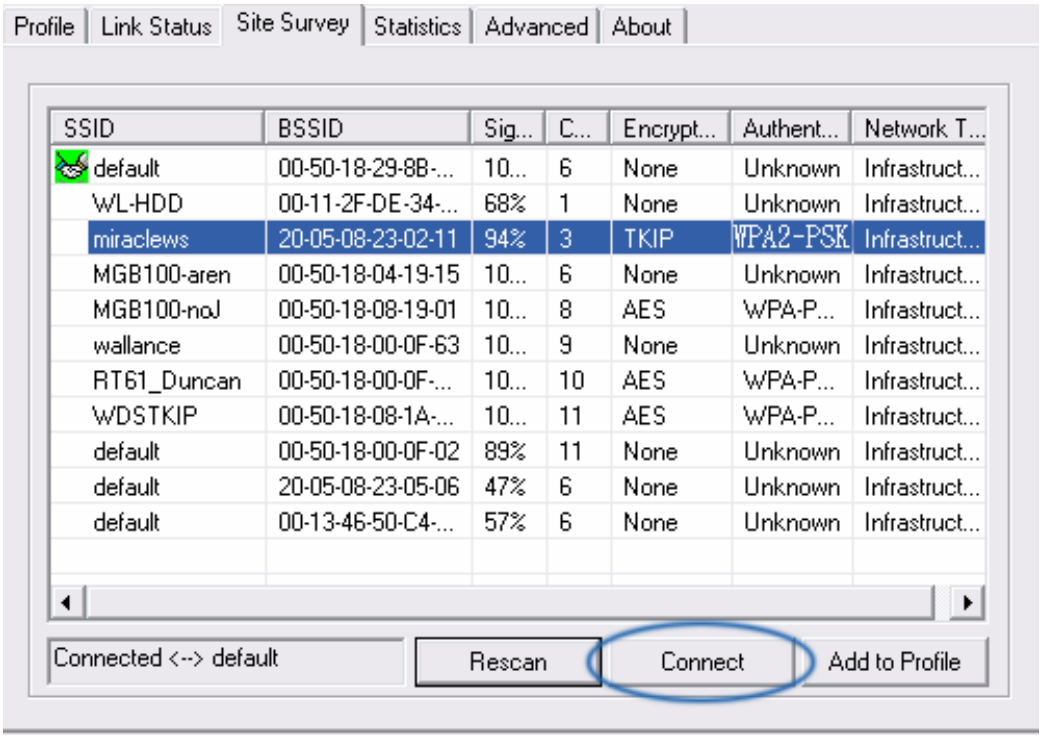


5-5 Configure connection with WPA2-PSK

1. Select the AP with WPA2-PSK authentication mode.

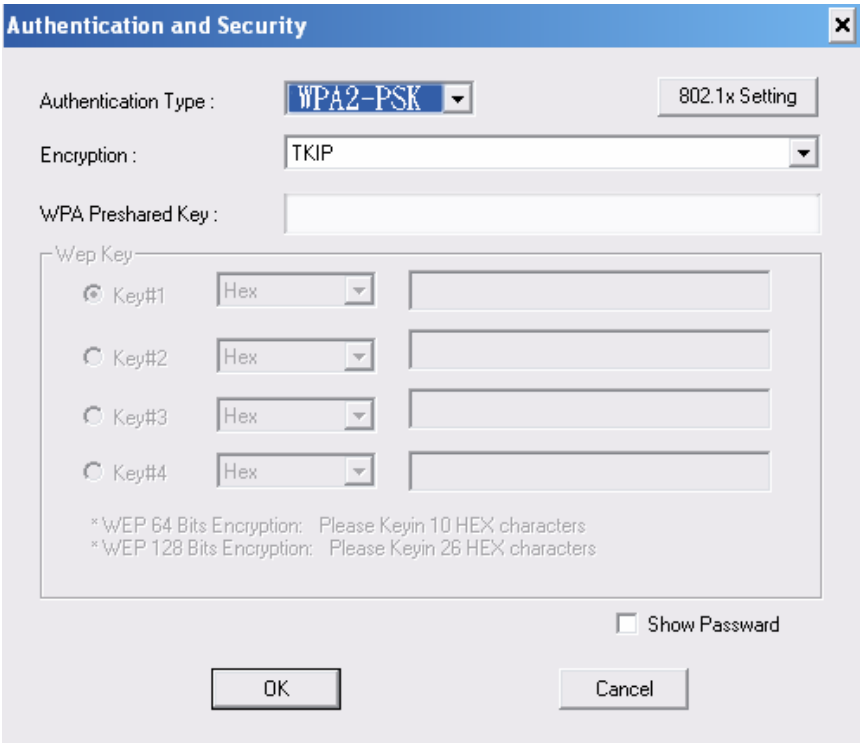


2. Click CONNECT or double click the intended network.



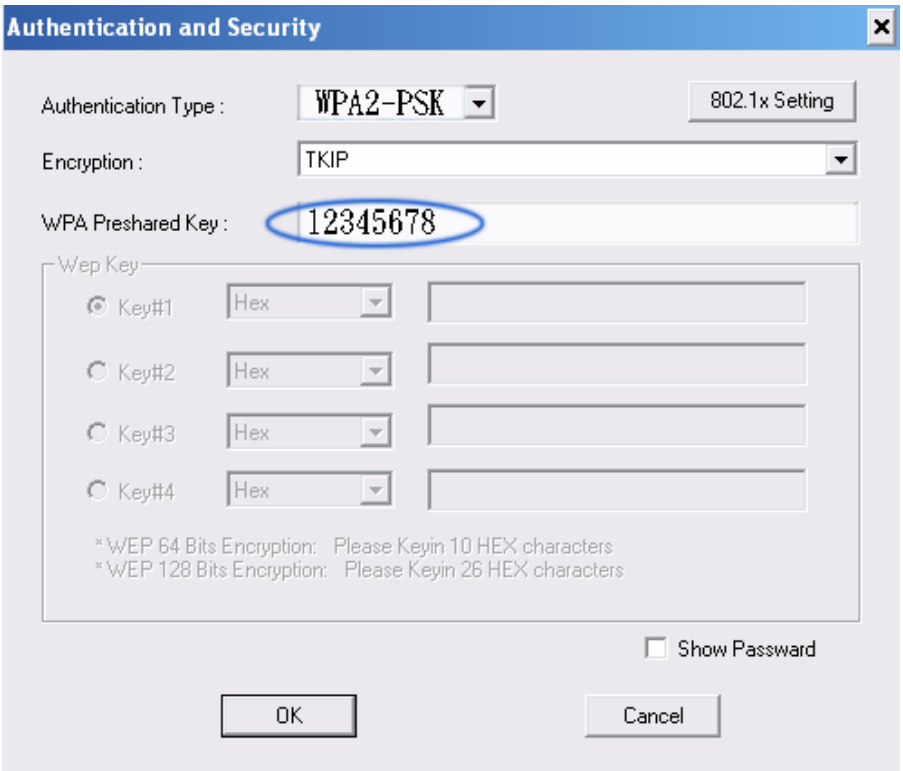
3. Authentication & Security page will pop up. TKIP, AES and Both (TKIP+AES) security are

support.



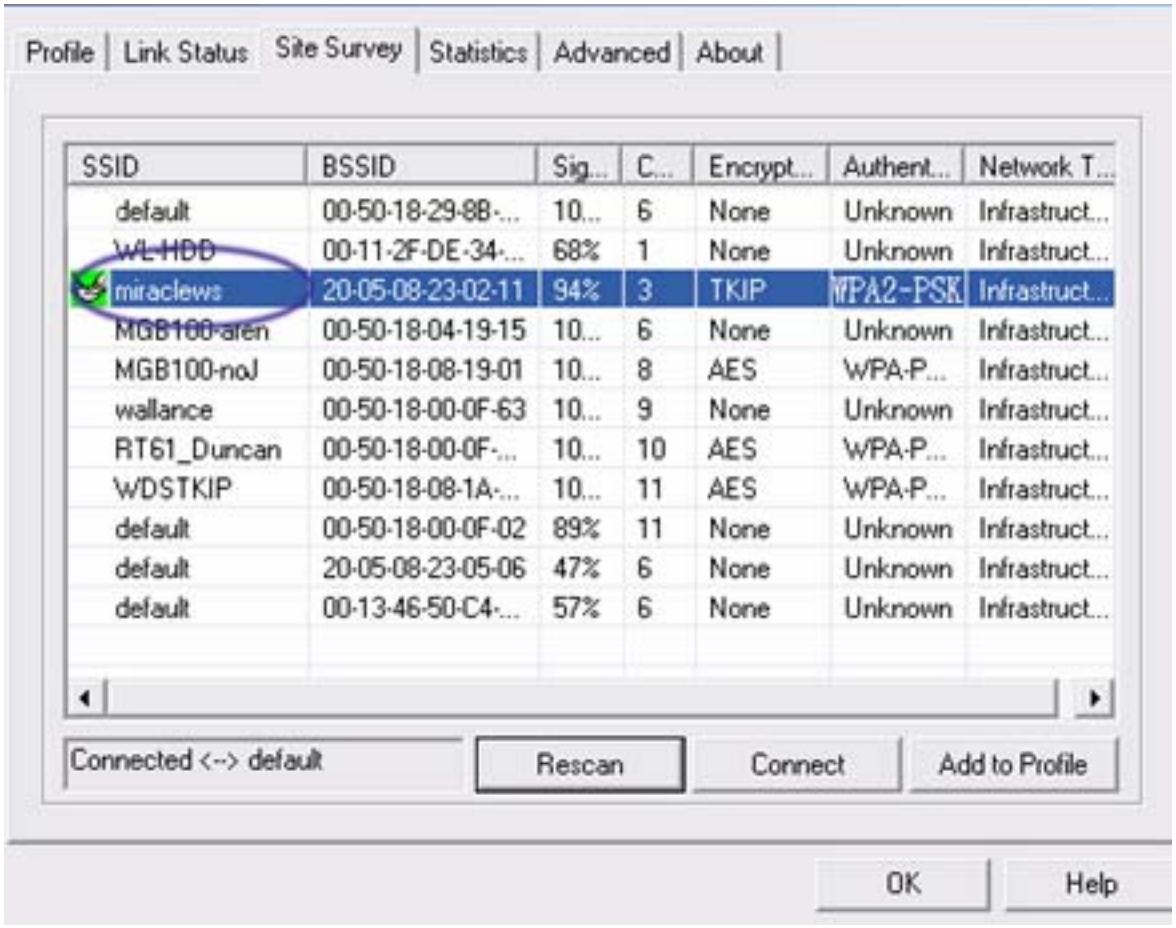
*If AP setup security to 〝Both〞(TKIP + AES), system define is AES that security is severely.

4. Authentication Type is WPA-PSK. Select correct encryption (TKIP or AES). Enter WPA Pre-Shared Keysecret as 12345678.



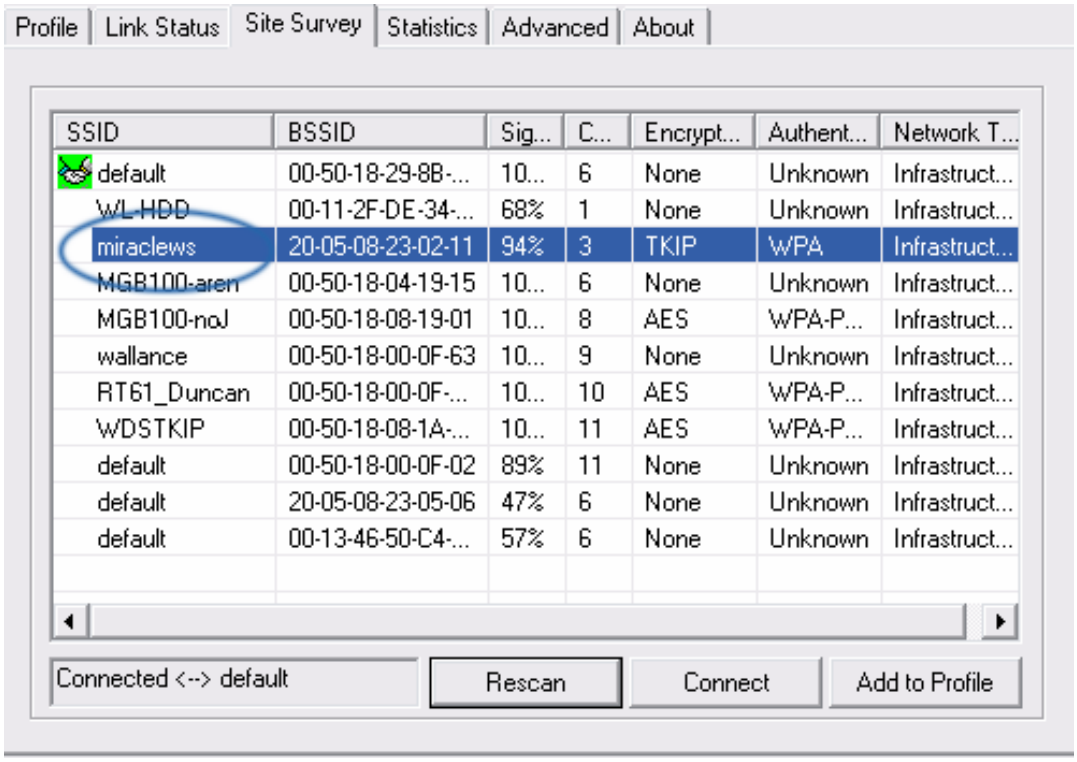
5. Click OK. Be careful, if the WPA Pre-Shared Key entered is not correct, even though the AP

can be connected, but you won't be able to exchange any data frames.

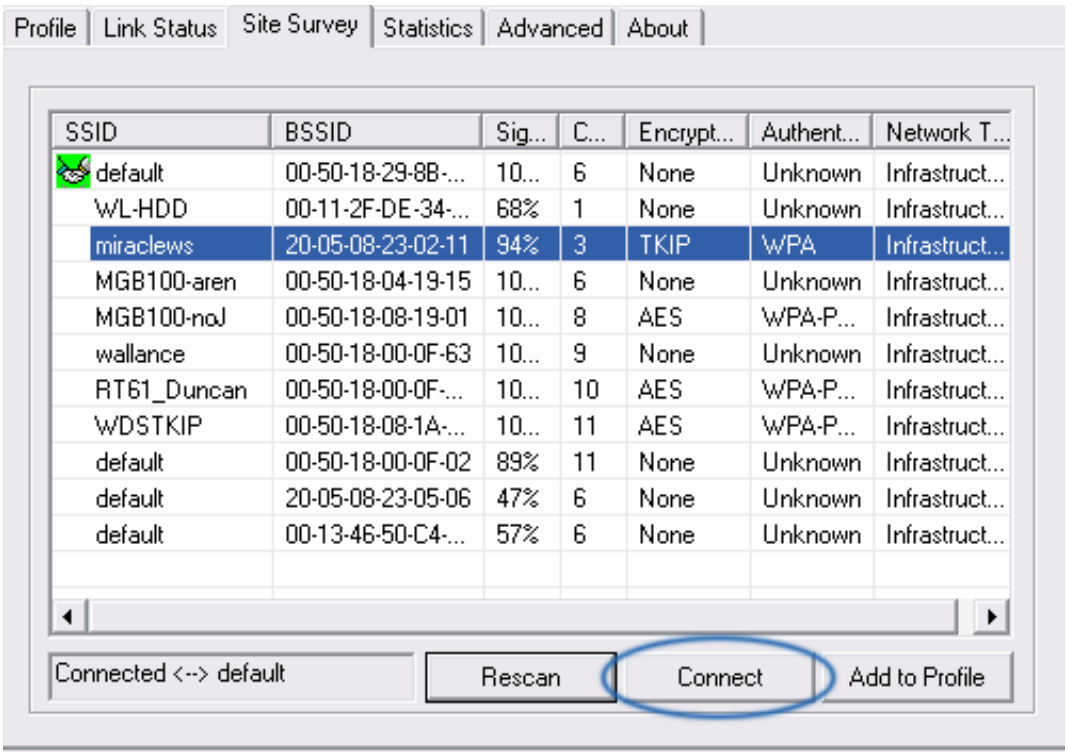


5-6 Configure connection with WPA by 802.1x setting

1. Select A.P with WPA authentication mode.

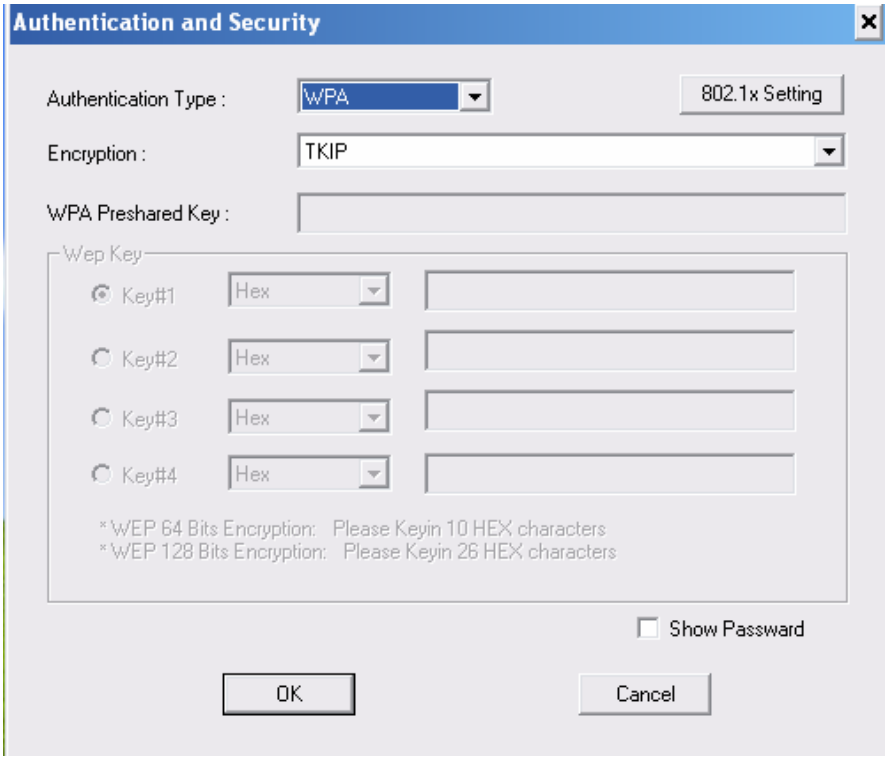


2. Click CONNECT or double click the intended network



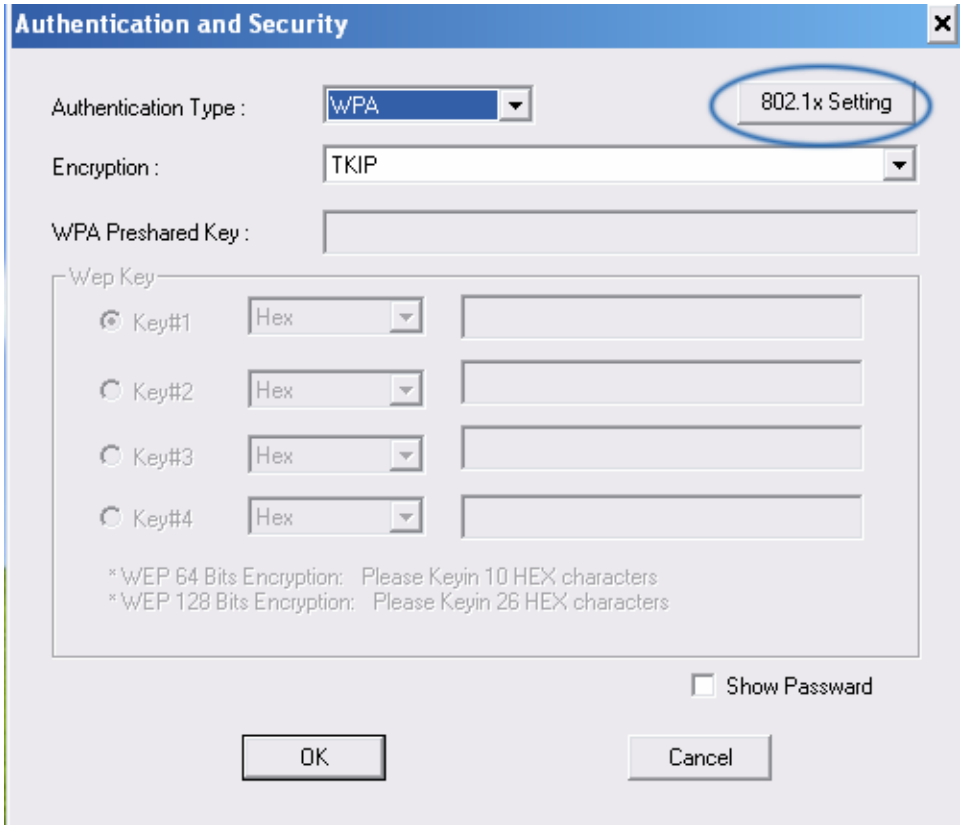
3. Authentication & Security page will pop up. TKIP, AES and Both (TKIP+AES) security are

support.

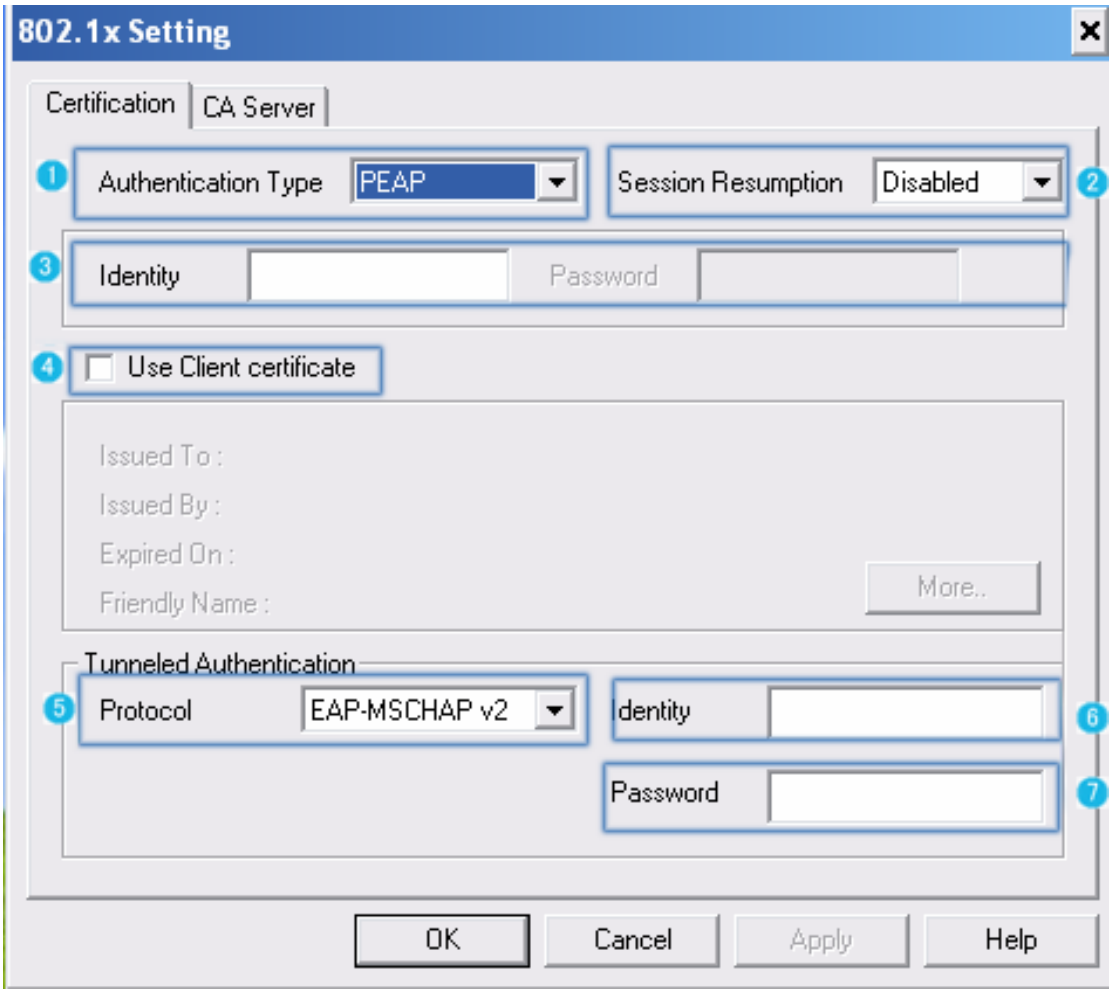


*If AP setup security to 〝Both〞(TKIP + AES), system define is AES that security is severely.

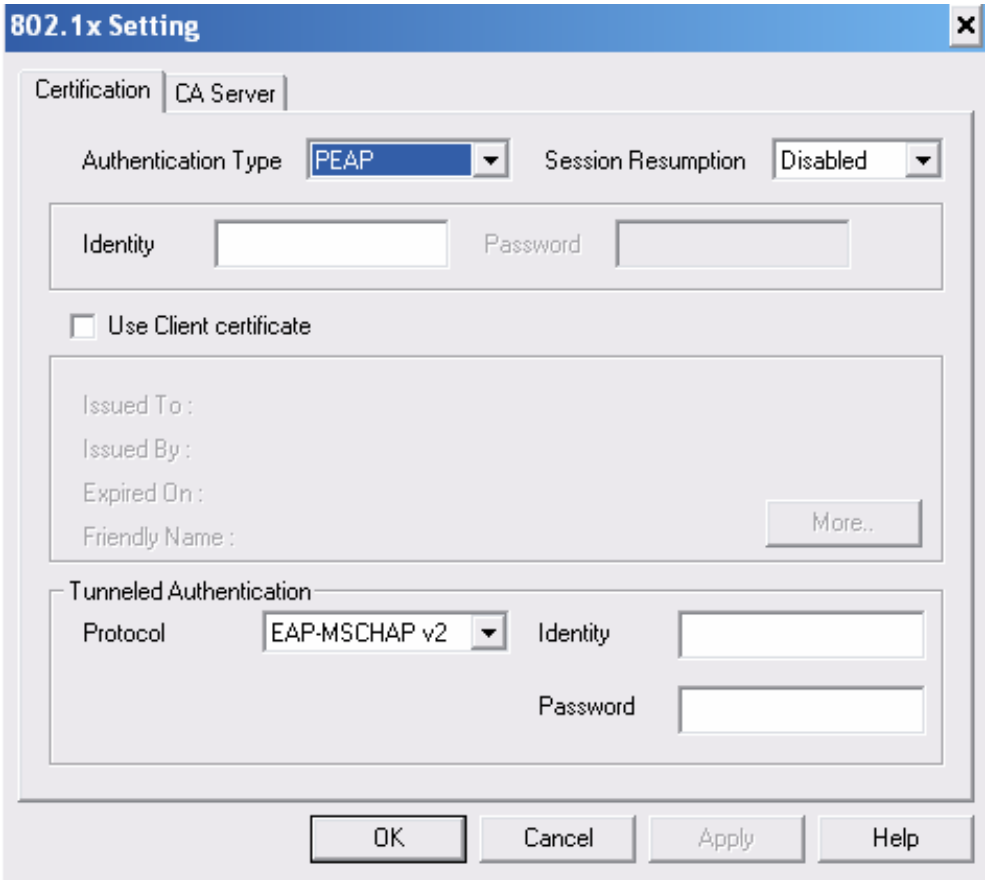
4. Click 802.1x setting.



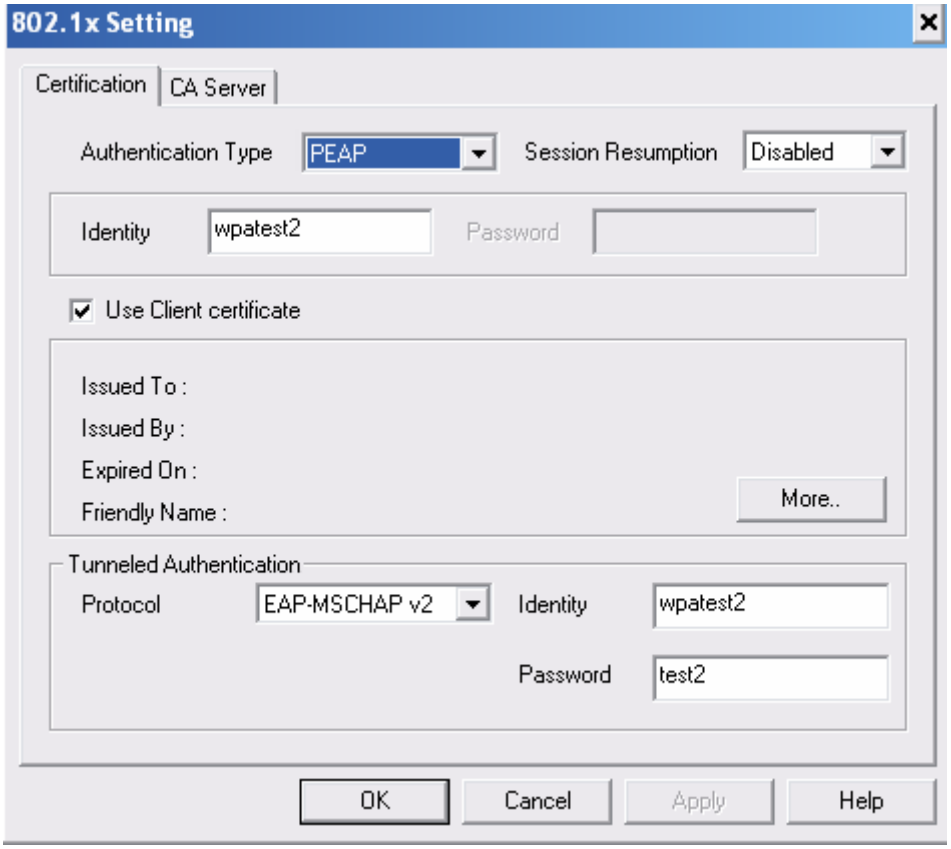
5. 802.1x setting page will pop up.



6. Authentication type and setting method:
   1. PEAP:
      i. Authentication type chooses PEAP, key identity into wpatest2. Protocol chooses EAP-MSCHAP v2 for tunnel authentication, tunnel identity is wpatest2 and tunnel password is test2. Those setting are same as our intended AP's setting.

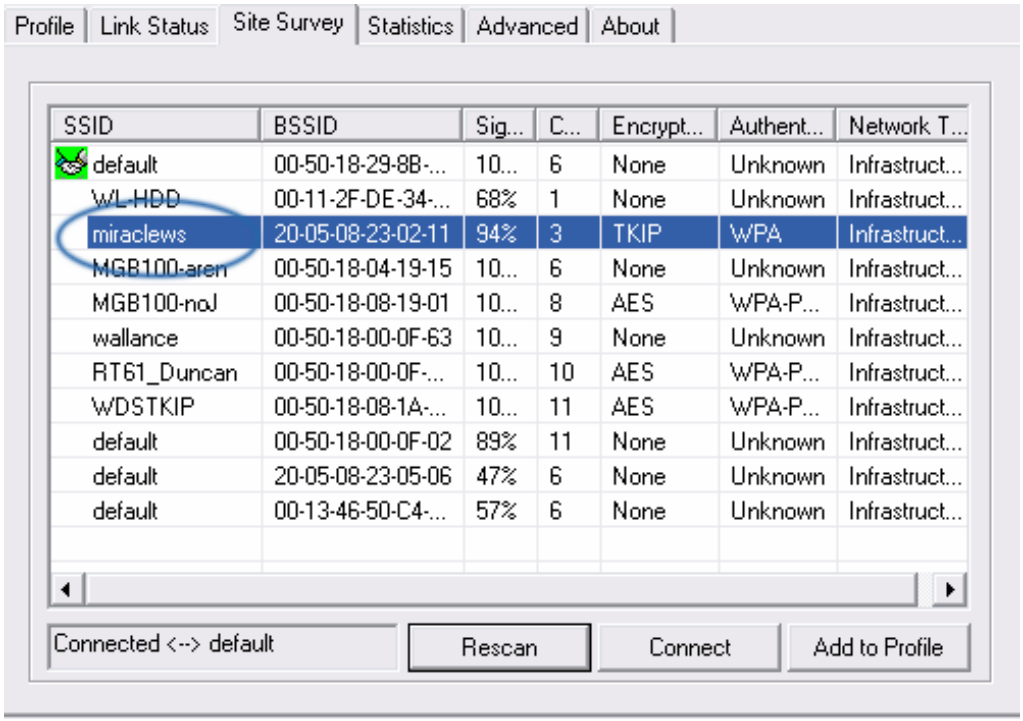


ii. Click OK. The result will look like the below figure.

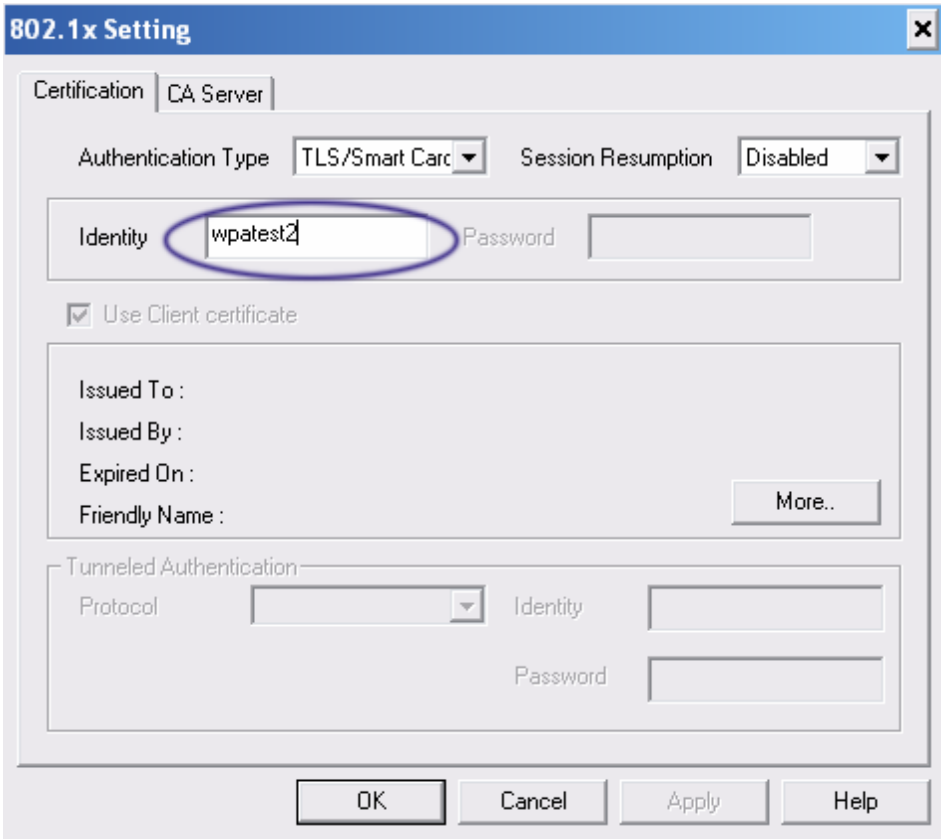


2. TLS / Smart Card:

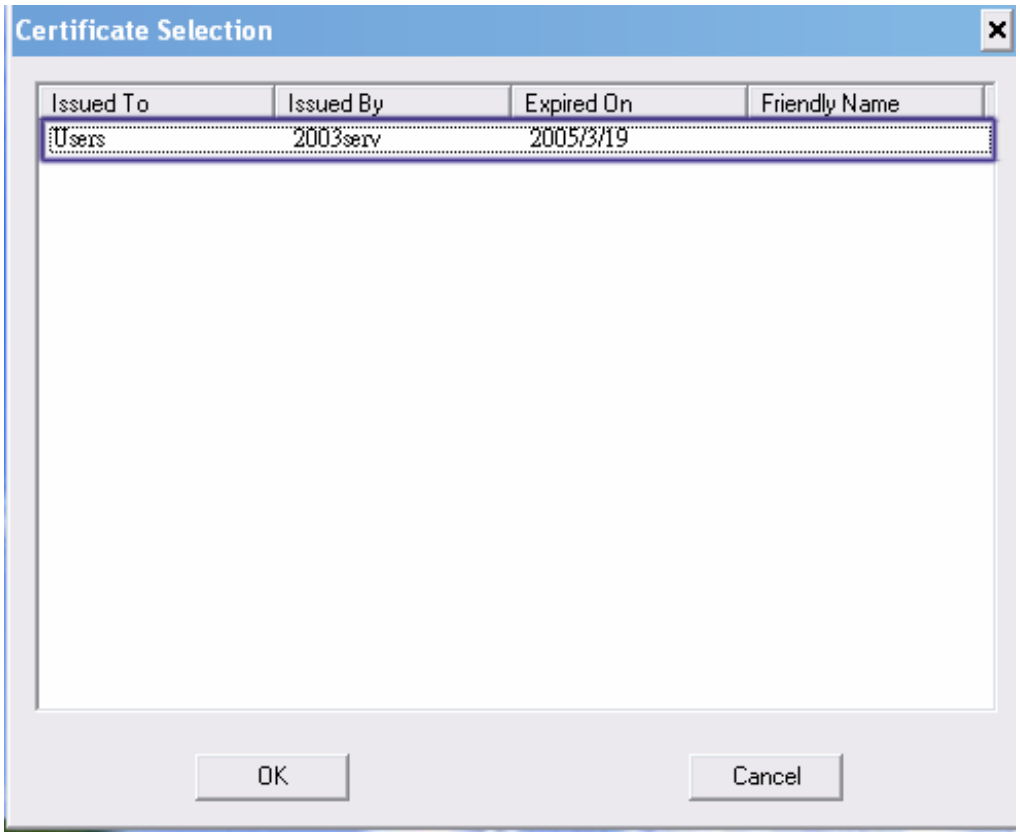
i. Authentication type chooses TLS / Smart Card, TLS only need identity that is wpatest2 for server authentication.



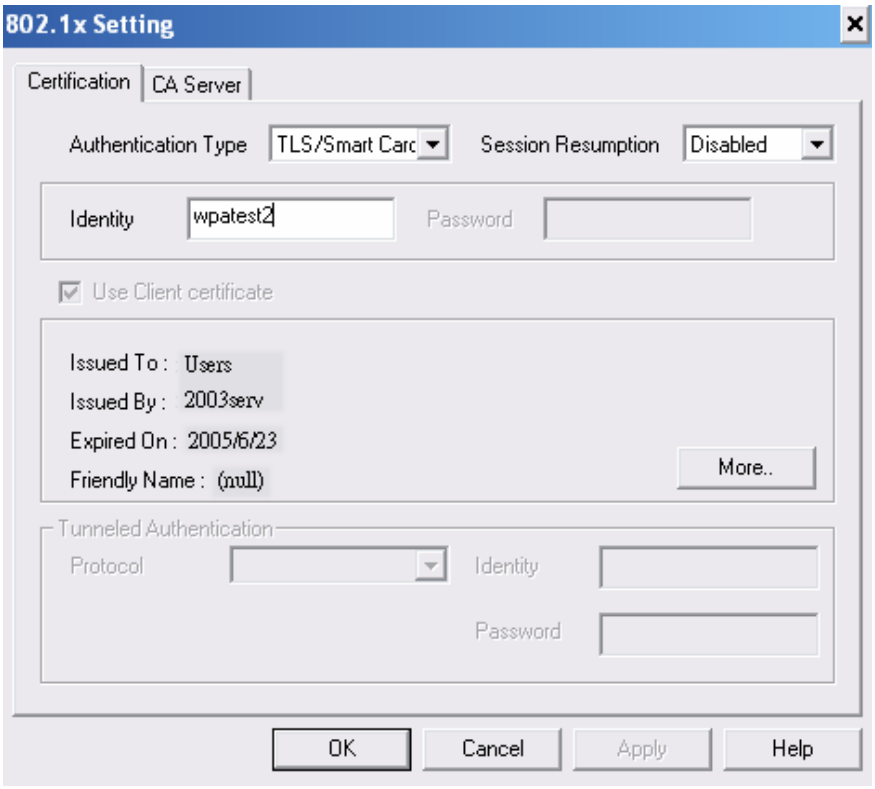
ii. TLS must use client certicate. Click more to choose certicate.



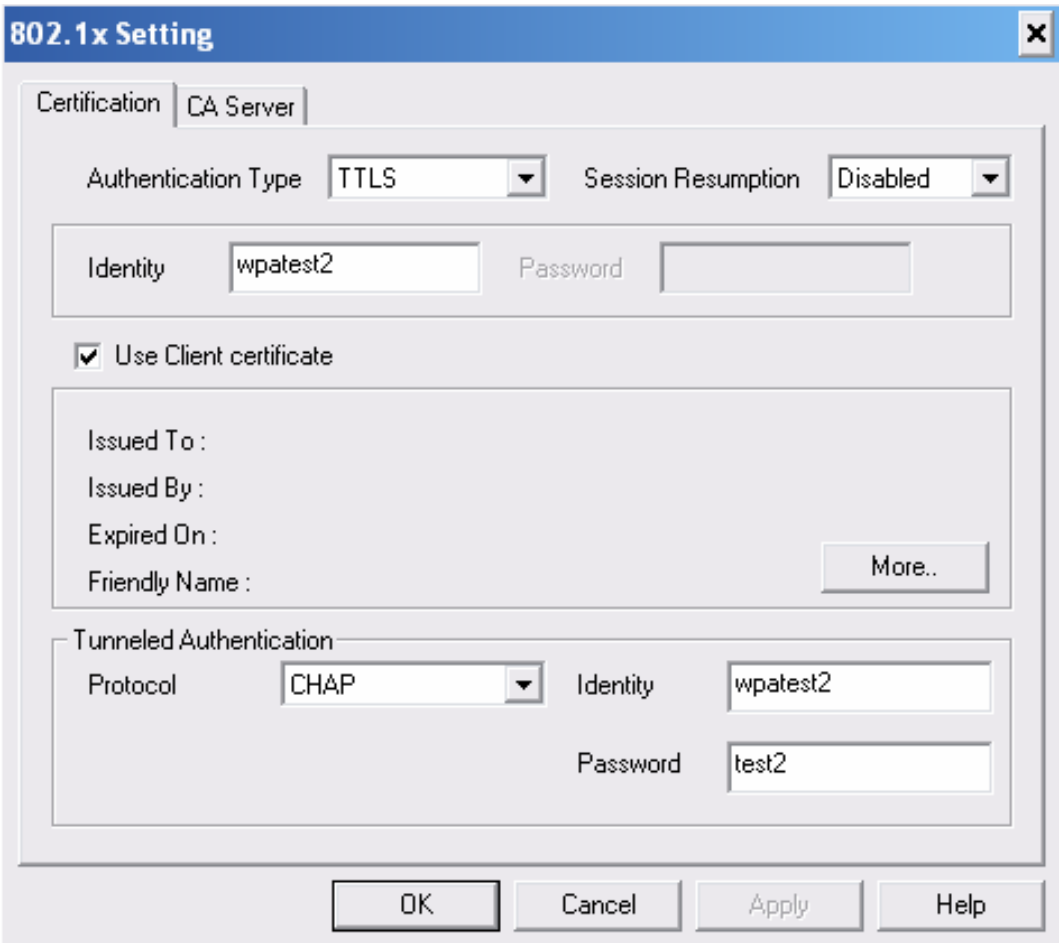
iii. Certicate page will pop up; choose a certicate for server authentication.



iv. Display certicate information in use client certicate page.

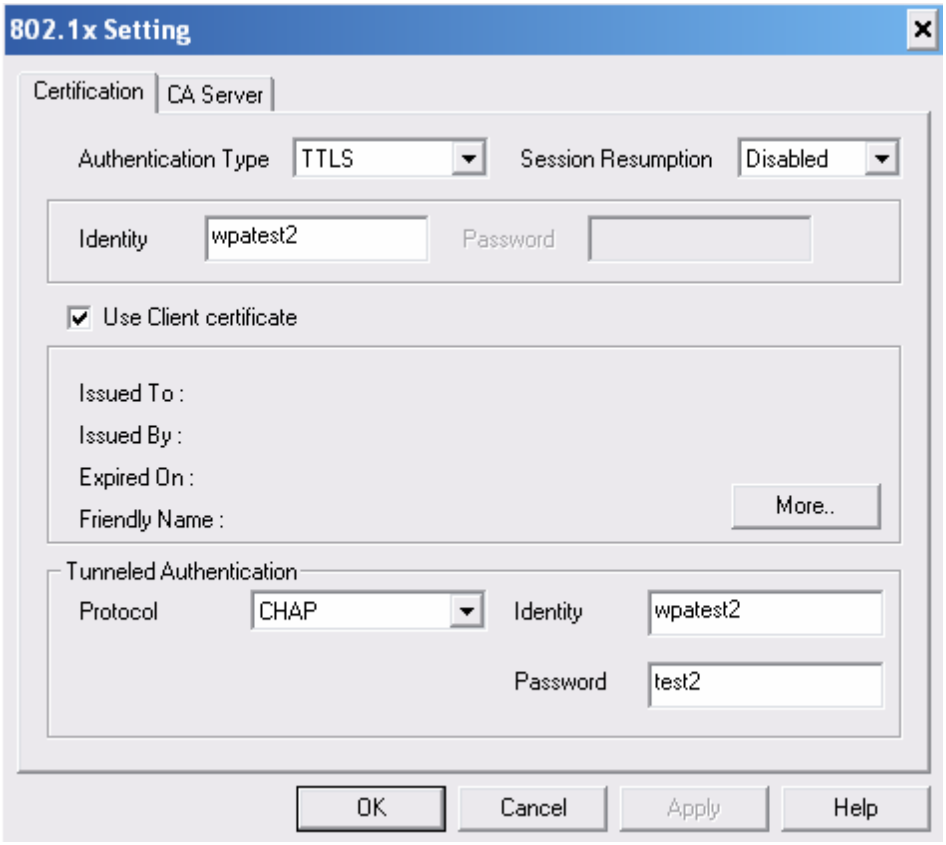


v. Click OK. The result will look like the below figure.

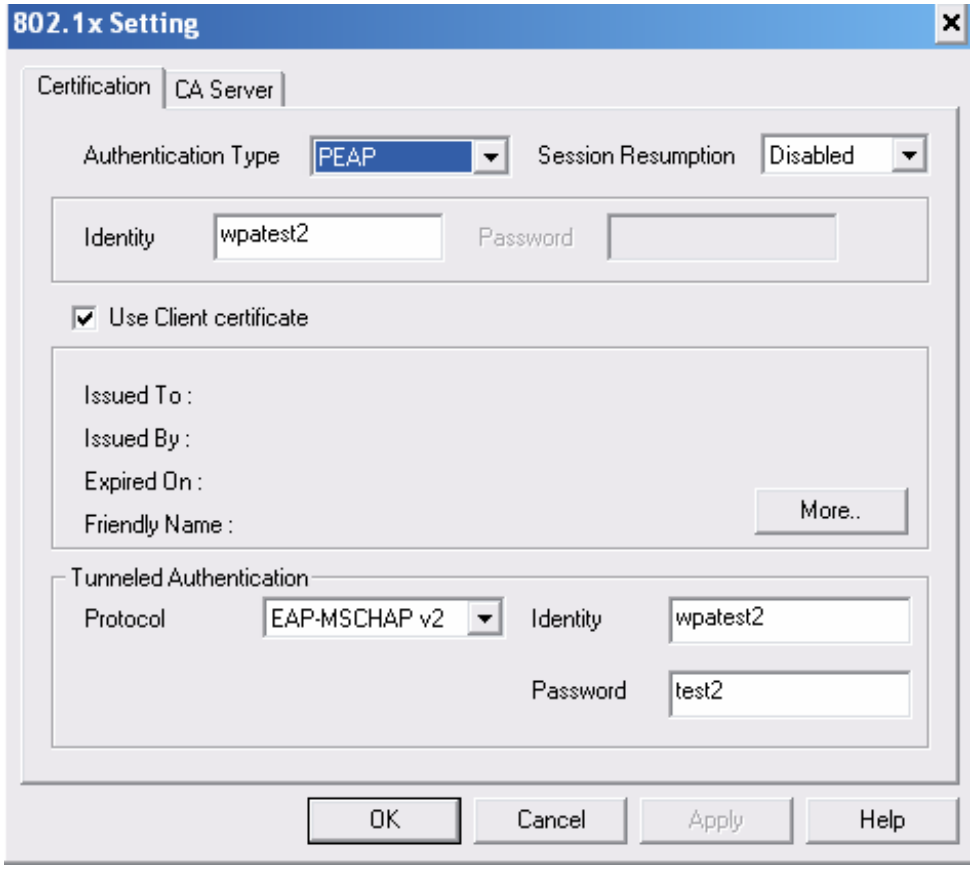


3. TTLS:

i. Authentication type chooses TTLS, identity is wpatest2. Protocol chooses CHAP for tunnel authentication, tunnel identity is wpatest2 and tunnel password is test2. Those setting are same as our intended AP's setting.

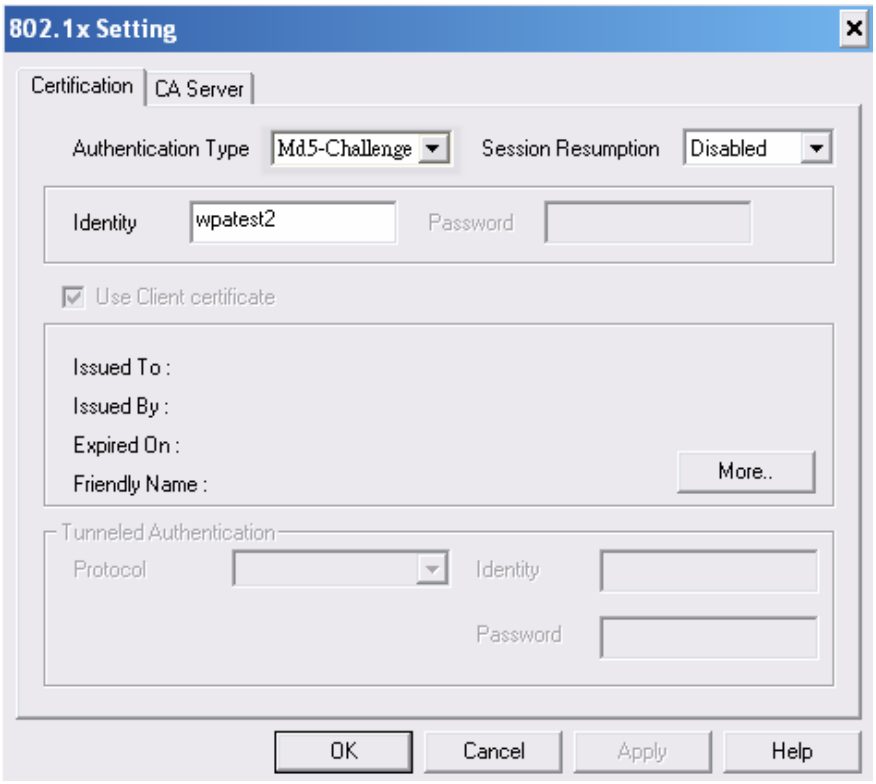


ii. Click OK. The result will look like the below figure.

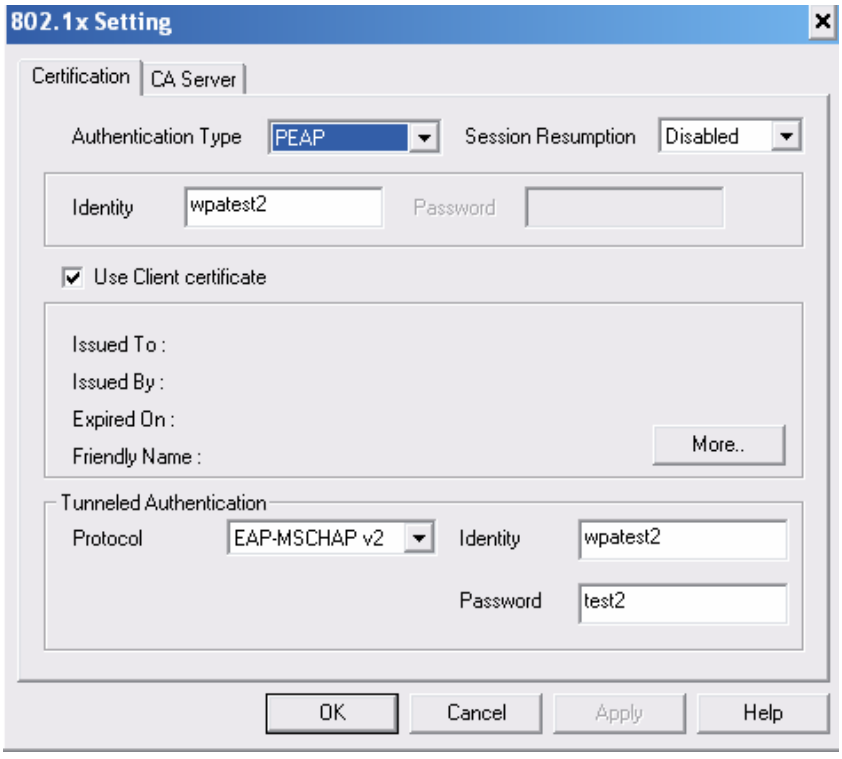


4. MD5:

i. Authentication type chooses MD5, MD5 only need identity and password that are wpatest2 and test2 for server authentication.

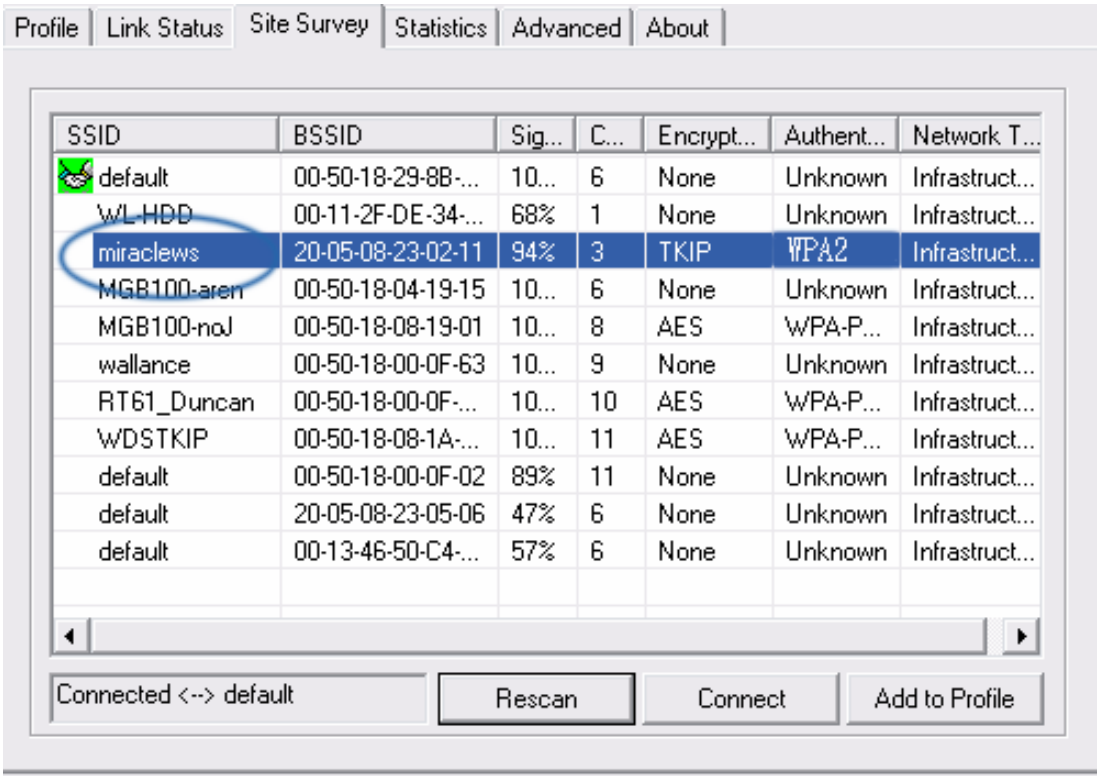


ii. Click OK. The result will look like the below figure.

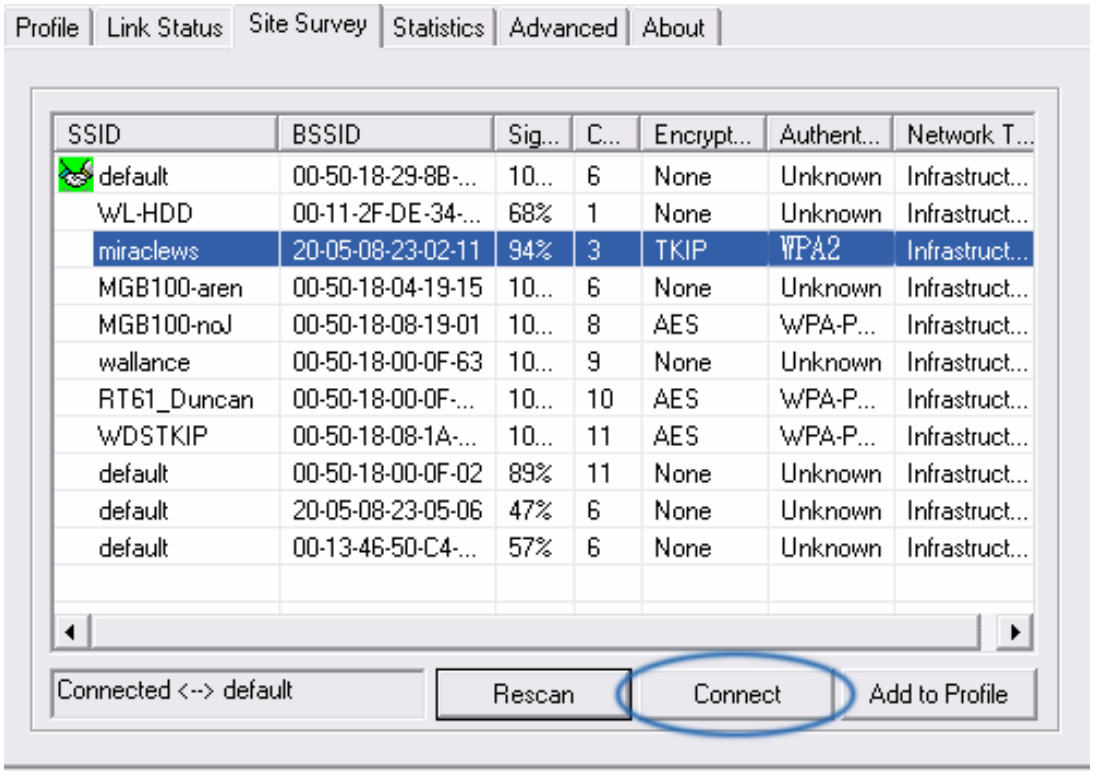


5-7 Configure connection with WPA2 by 802.1x setting

1. Select A.P with WPA2 authentication mode.

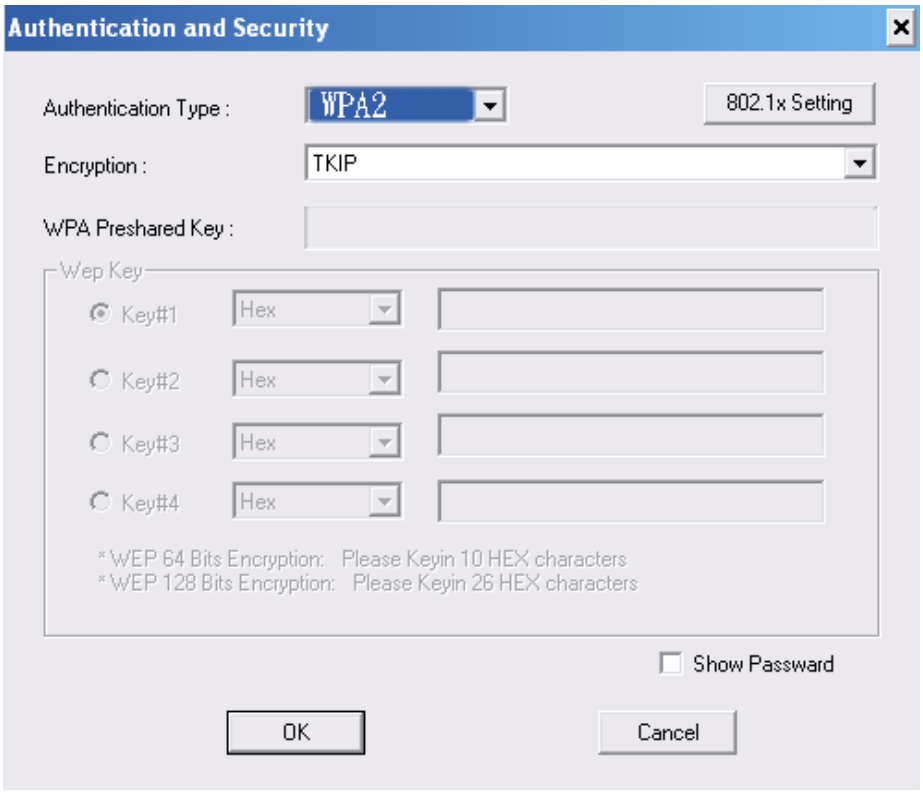


2. Click CONNECT or double click the intended network.



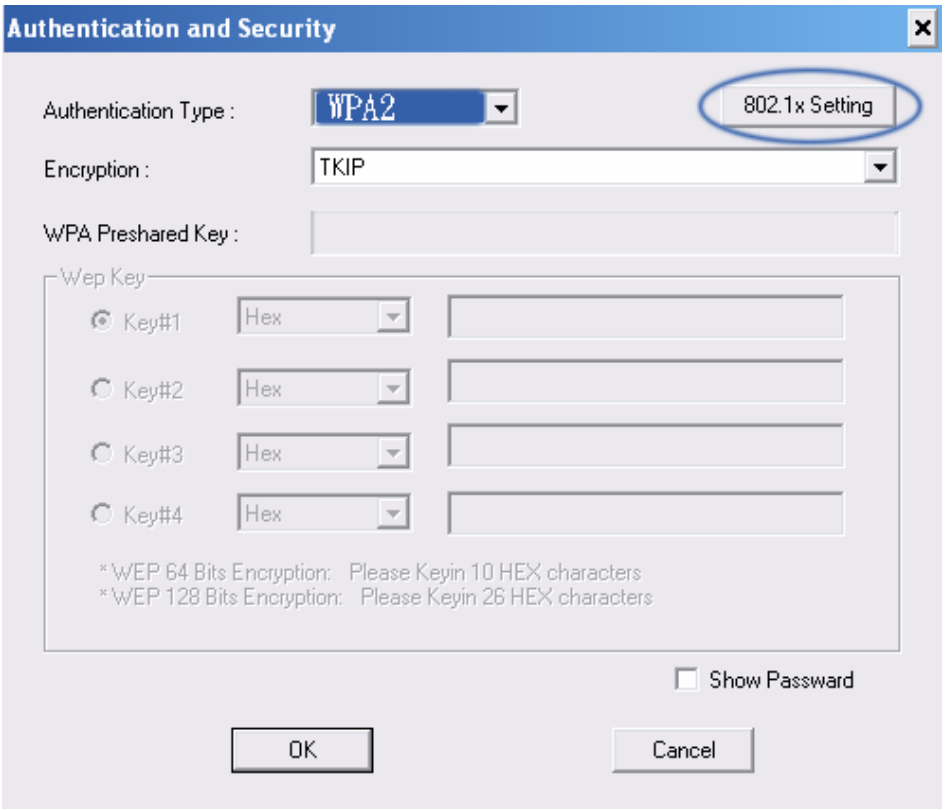
3. Authentication & Security page will pop up. TKIP, AES and Both (TKIP+AES) security are

support.

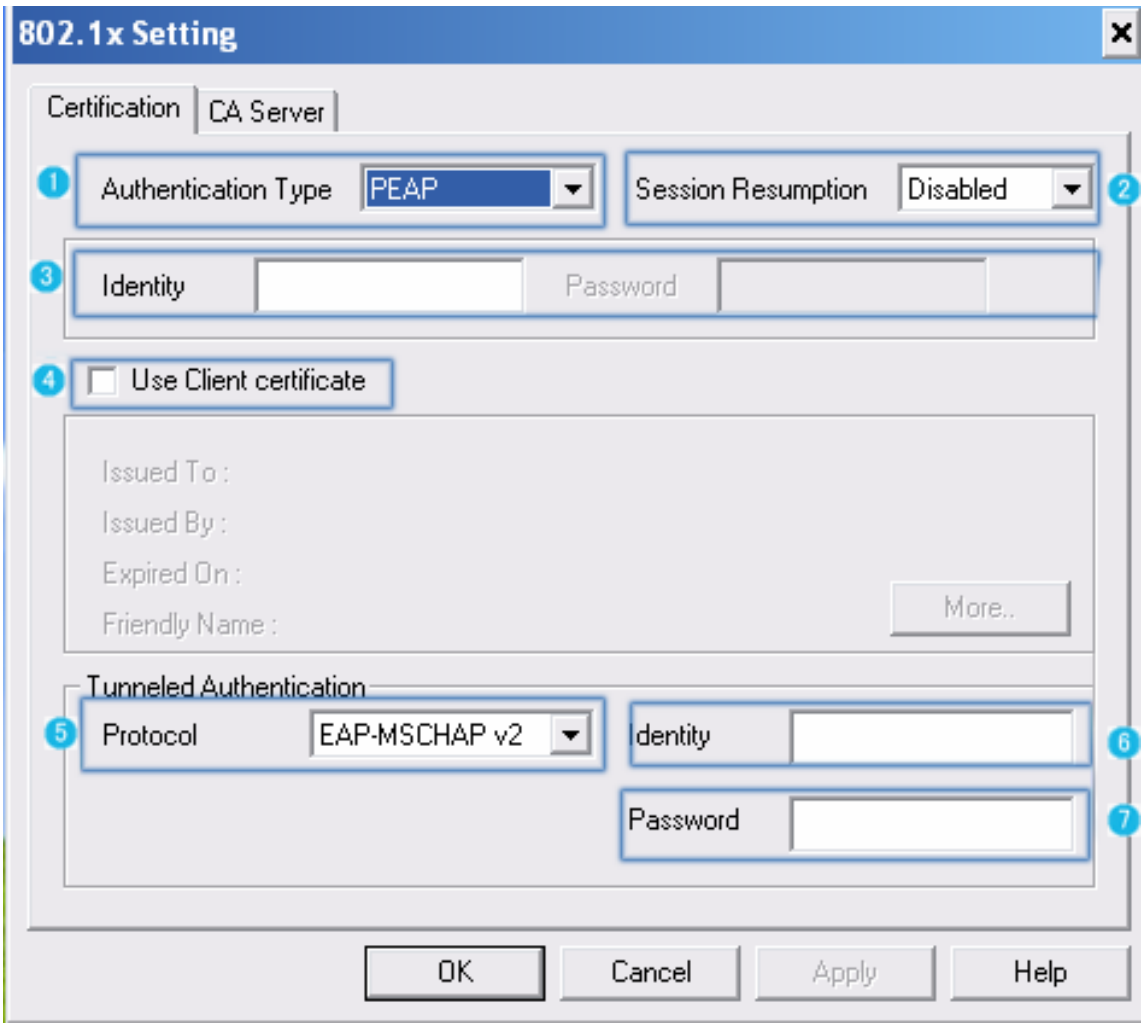


*If AP setup security to 〝Both〞(TKIP + AES), system define is AES that security is severely.

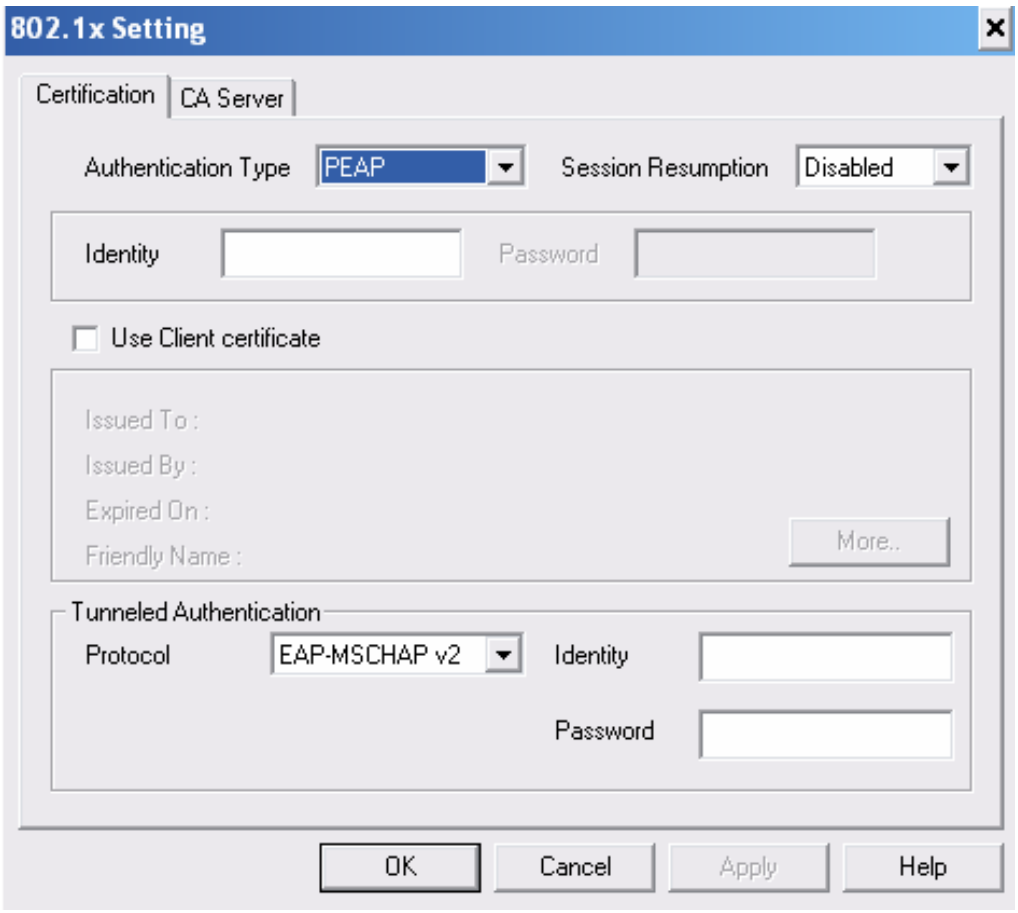
4. Click 802.1x setting.



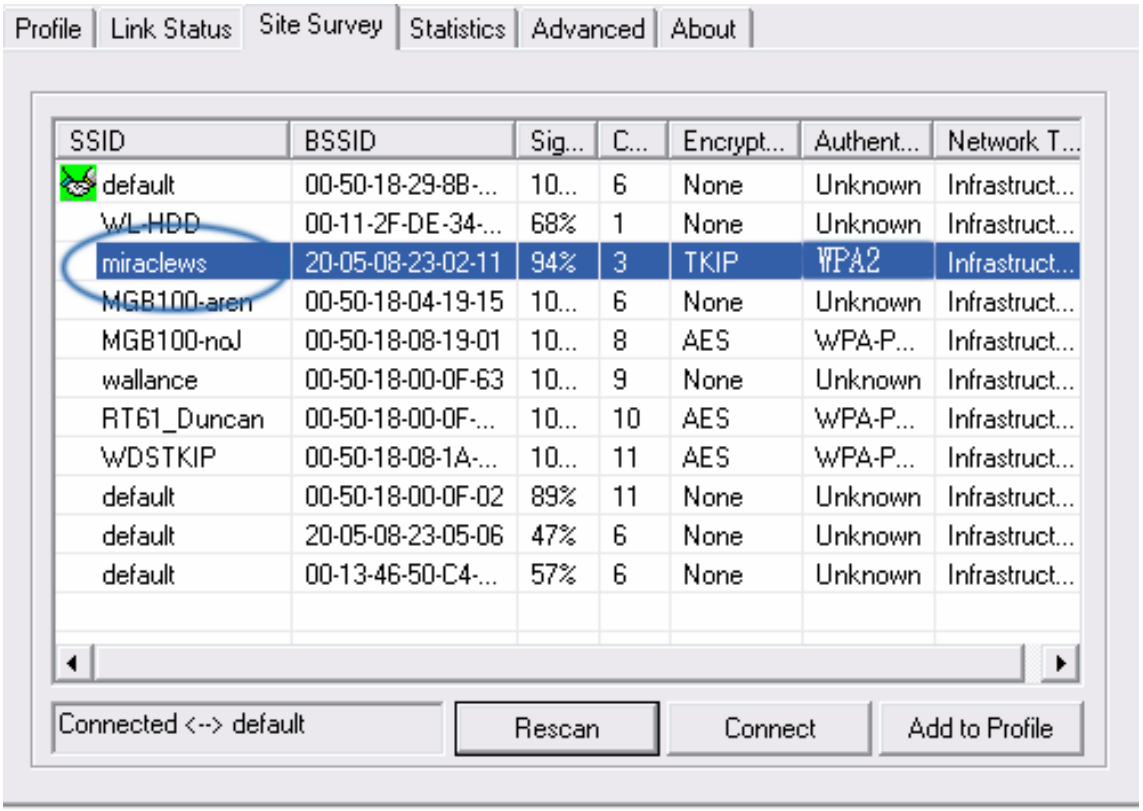
5. 802.1x setting page will pop up.



6. Authentication type and setting method:
   1. PEAP:
      i. Authentication type chooses PEAP, key identity into wpatest2. Protocol chooses EAP-MSCHAP v2 for tunnel authentication, tunnel identity is wpatest2 and tunnel password is test2. Those setting are same as our intended AP's setting.

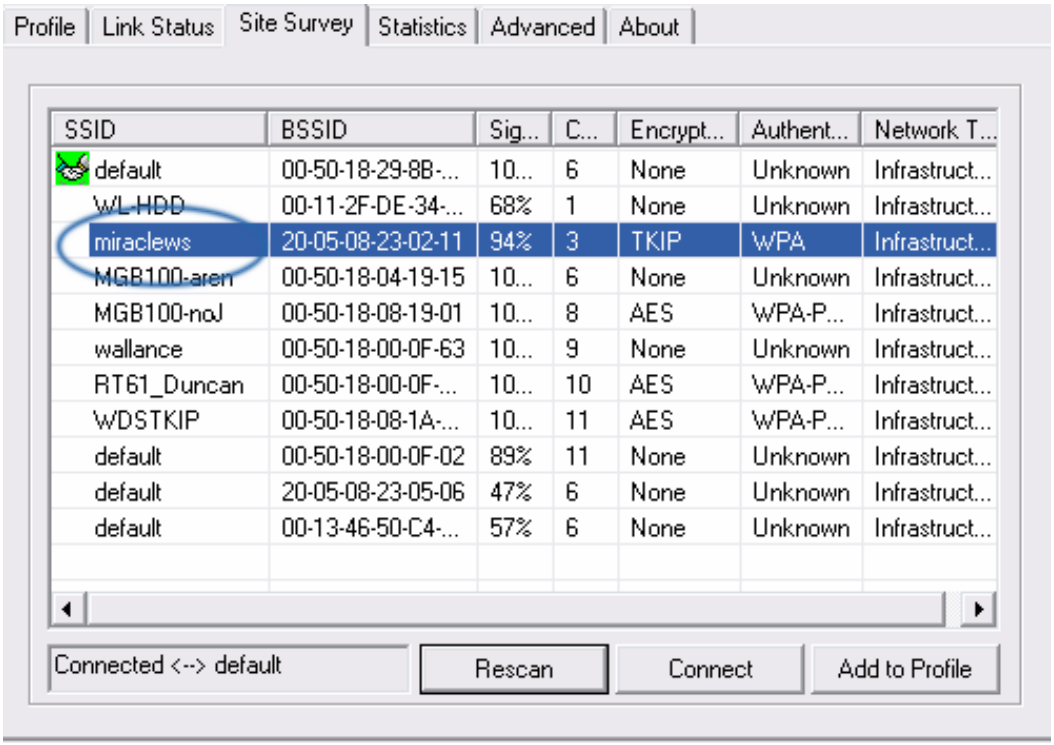


ii. Click OK. The result will look like the below figure.

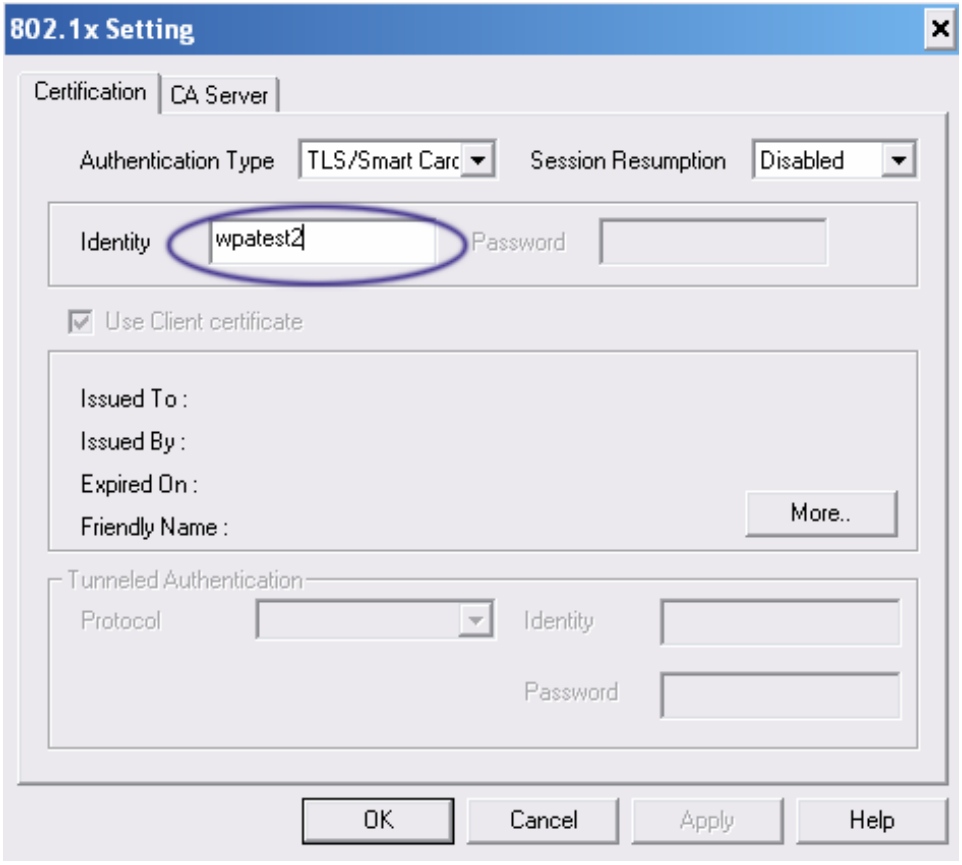


2. TLS / Smart Card:

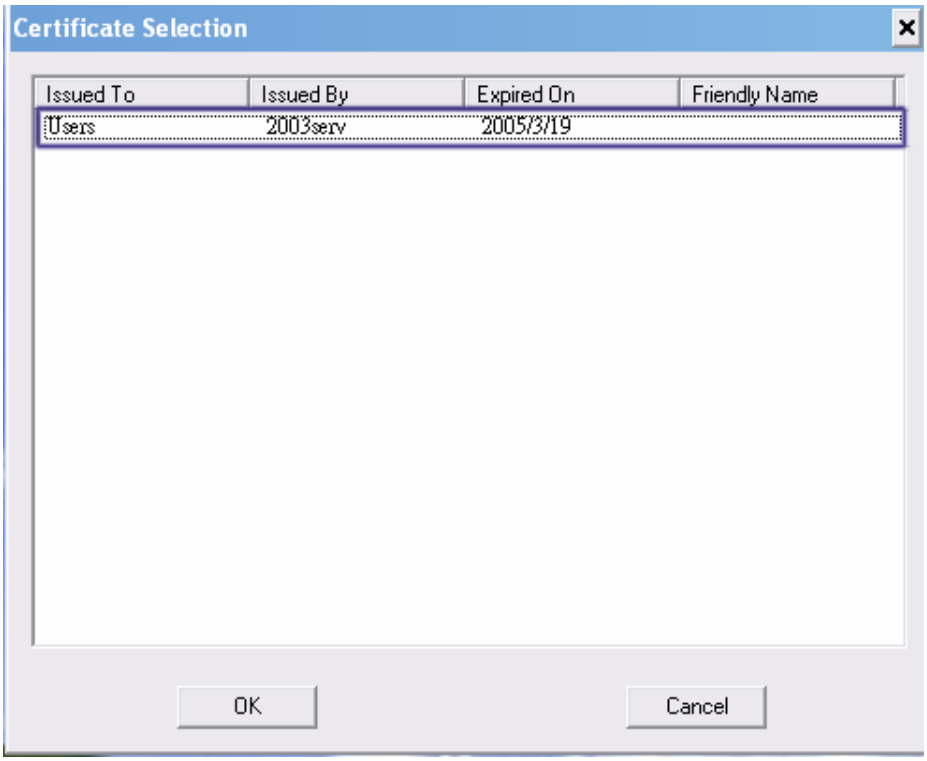
i. Authentication type chooses TLS / Smart Card, TLS only need identity that is wpatest2 for server authentication.



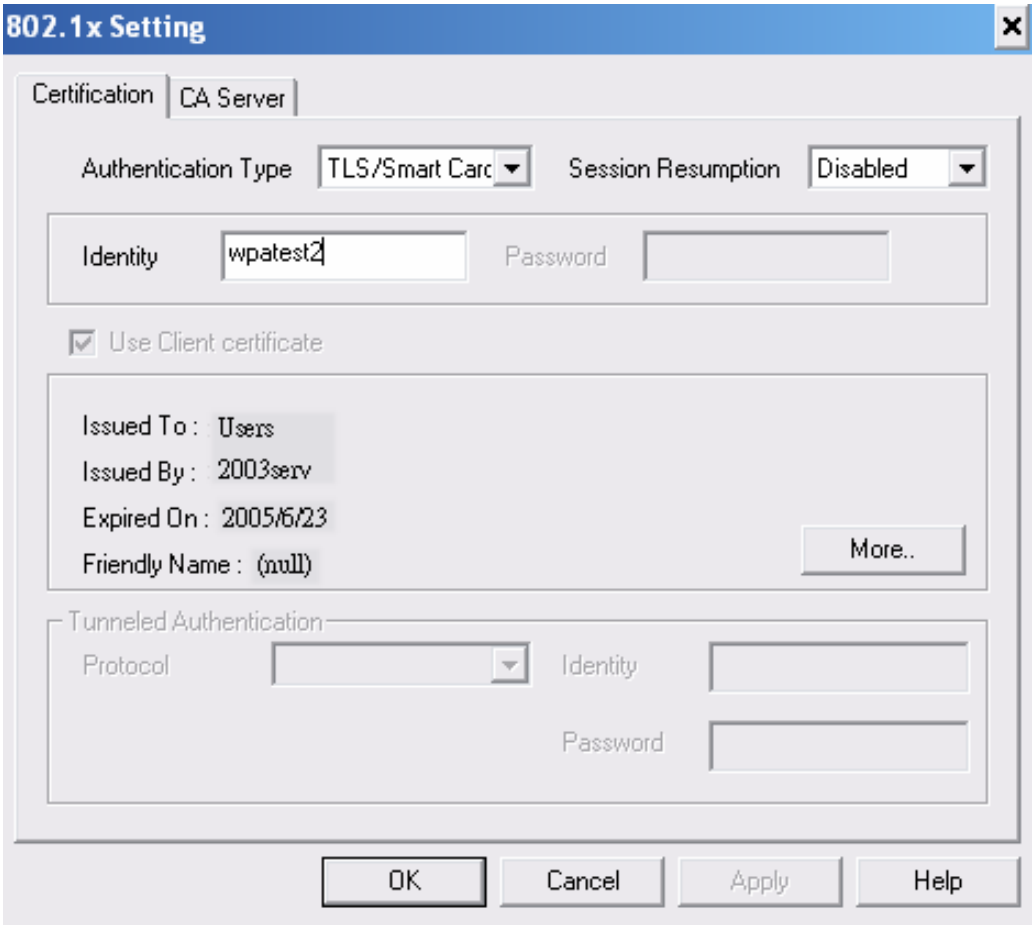
ii. TLS must use client certicate. Click more to choose certicate.



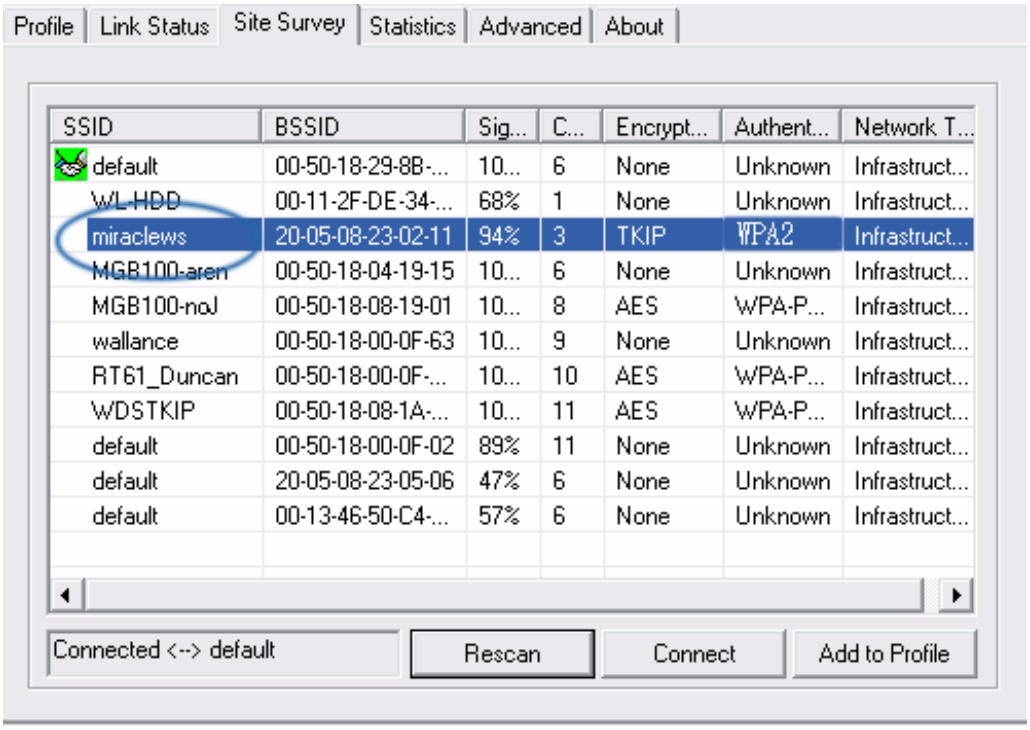
iii. Certicate page will pop up; choose a certicate for server authentication.



iv. Display certicate information in use client certicate page.

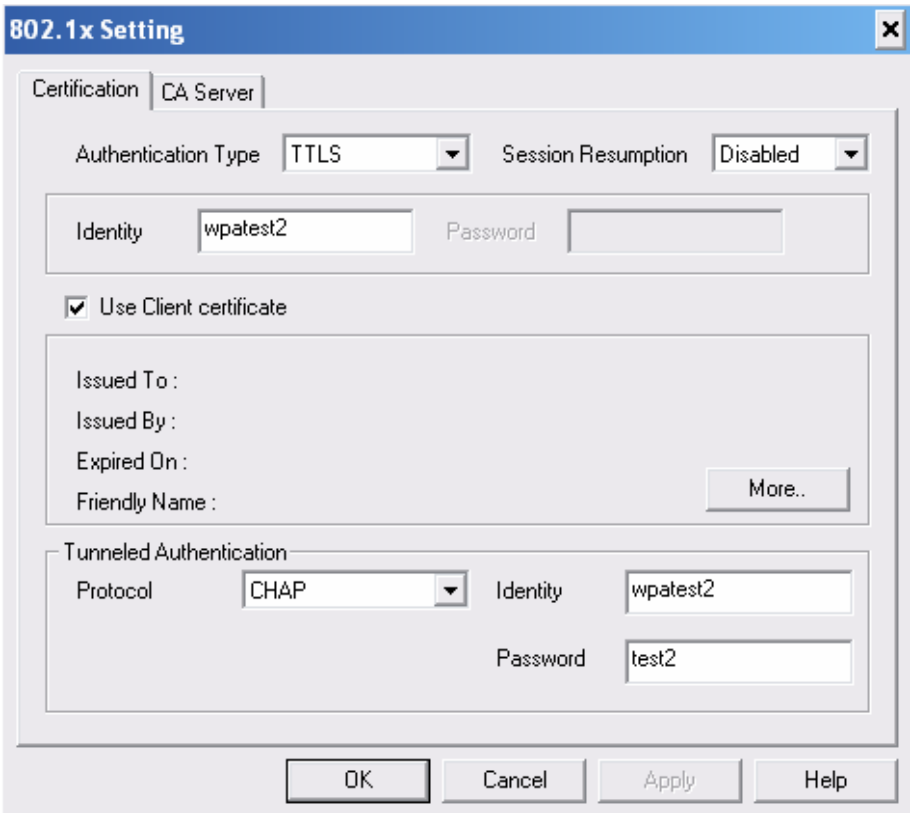


v. Click OK. The result will look like the below figure.

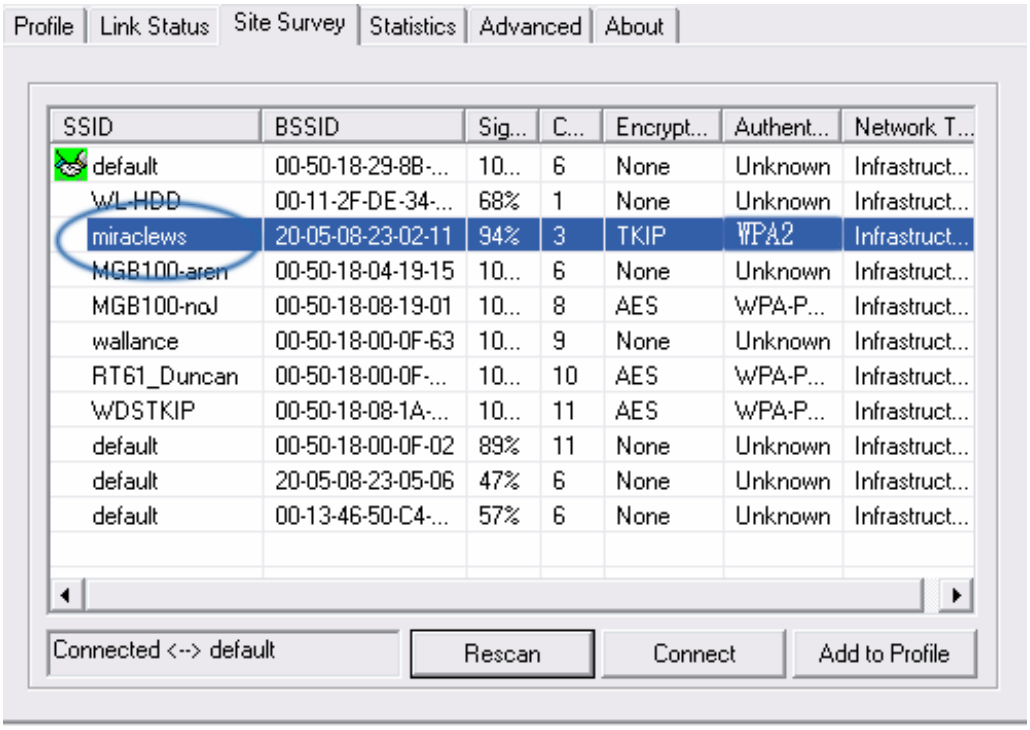


3. TTLS:

i. Authentication type chooses TTLS, identity is wpatest2. Protocol chooses CHAP for tunnel authentication, tunnel identity is wpatest2 and tunnel password is test2. Those setting are same as our intended AP's setting.

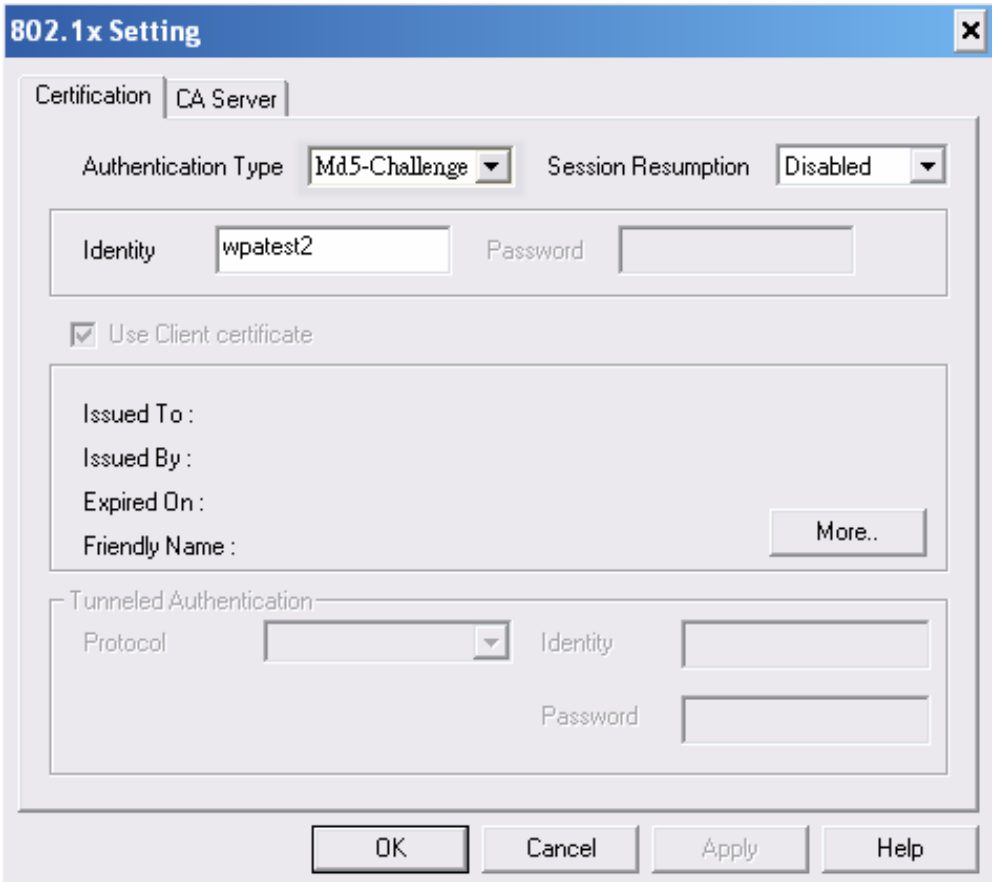


ii. Click OK. The result will look like the below figure.



4. MD5:

i. Authentication type chooses MD5, MD5 only need identity and password that are wpatest2 and test2 for server authentication.



ii. Click OK. The result will look like the below figure.